Telephony

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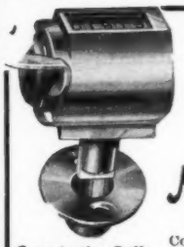

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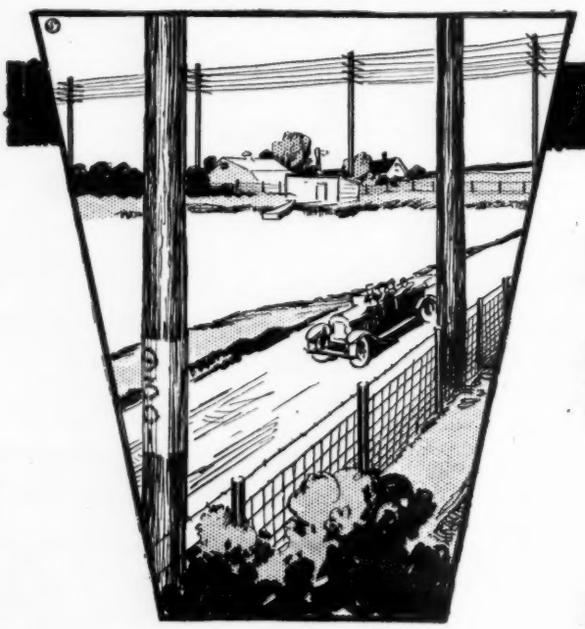

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THE AMERICAN TELEPHONE JOURNAL

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CURRENT OPINIONS AND COMMENTS

The faithfulness, efficiency and general heroism of telephone operators are well known to those engaged in the business, but are not always adequately appreciated by the general public.

It is, therefore, gratifying to call attention to an article in The Outlook for April 21, which pays a glowing tribute to the switchboard girls on duty all over the country, and recites many incidents of their brave work in times of disaster, when they stayed at their posts and saved life and property at their own peril. Most of these cases were recorded in TELEPHONY's columns at the time of their occurrence, but it is considered fortunate that The Outlook should remind the public at large of the splendid service of the telephone girls at this particular time, when there seems to be a tendency throughout the United States to nag "Central," and complain about service.

It is undeniably reasonable to attribute much of the general complaint about telephone service to the unrest and irritation that seem to afflict all of us more or less at this time. The high cost of living, the labor troubles, the thousand and one difficulties of living and doing business, seem to be magnified manyfold at present and have set the nerves and temper of the average citizen on edge. He is quick on the trigger and prone to "take it out" on everything that irritates him.

No wonder a delayed telephone call, therefore, causes him to explode and denounce the service as wretched. That is happening all over the country today, and is a sign of the general irritability of the people. Naturally, it is more evident in the big cities, where the nerve tension is more pronounced, and where high costs, profiteering and labor agitation are bearing most heavily on the average man.

* * * *

In times of fire, flood and storm, the telephone operator has repeatedly proved her heroism, and The Outlook article is studded with incidents in which she has stuck to the job to give warnings and to summon help, imperilling her own life to save others.

Sometimes, too, she paid for this bravery at the cost of her own life, and was found dead at her post with her receiver still strapped to her ears, an emblem of her devotion to duty, "even unto death."

* * * *

Much of our American humor is misapplied, and the custom of fiction story writers and professional joke-smiths to lampoon the telephone girl, does a rank injustice to thousands of efficient operators. In summing up their service, The Outlook says:

"Fortunately for the public, the telephone girl has always proved herself to be a person of unusual presence of mind and ever-ready resources. She is made alert by her work, and her mind is trained to instant action. She has to learn self-control, since there is hardly another position so trying and made so unpleasant by the idiosyncrasies of unfeeling telephone subscribers. If a girl can keep her wits under the bombardment of abuse, censure, silly questions and overtures from mashers, it is difficult to imagine circumstances that would cause her to lose her head.

"*The telephone girl is undoubtedly one of the most intelligent, refined and necessary elements in modern society.* She has been grossly maligned by wooden-headed upstarts. One reason for the false impression concerning the intellectual character of the telephone girl is that the writers of light fiction have specialized in the effort to portray her as she never was and never will be. Many little stories have been written that touch upon the telephone girl in hotel life, and in most cases she is pictured chattering ungrammatically with bellhops, exchanging confidences with strangers, making dates with patrons and accepting theater tickets from any one who proffers them.

"Any one with an ounce of sense realizes that the telephone girl is not of this type, and that, were she so frivolous and ineffective as these people try to make her out, she would not be able to hold her job 30 seconds in any exchange in the country. It is high time that the petulant public cease taking out their morning grouches on the exchange operators. Every community owes much to the telephone girl and should vigorously

resent any light-headed aspersions to her discredit."

* * * *

The roar of complaint against the postal service now going up all over the country makes the "kicks" against the telephone seem like positive praise.

Business men everywhere say that the mails were never so demoralized as they are today. All classes of mail are delayed, not only hours, but days, and the postoffice officials privately own "the corn," and admit that the service is far behind the times.

* * * *

They attribute it to a lack of competent help, and say the reason for that is insufficient pay for the carriers and clerks. In Chicago, as a desperate remedy, the postoffice officials have been hiring high school boys as extras to help out, but the fact that they had to pay this green help more than their regular employes only added to the ill-feeling, which was natural.

It is lucky the telephone business is not being operated by the postoffice department at this time. If it were, Mr. Burleson might blame the chaotic condition of the mails on the telephone department. Or he might draft the telephone men into helping sort and deliver the mail!

* * * *

TELEPHONY subscribers are sending in letters complaining they are receiving their paper many days late, but we can only ask them to be patient and they will eventually get all their copies. The paper goes into the mail promptly every Thursday. The delay is the fault of Uncle Sam.

Publishers of periodicals are paying more for their second class postage than ever before, and are getting poorer service than ever before. It cost nearly 60 per cent more to mail the April 24, 1920, issue of TELEPHONY then it did the corresponding issue of 1919, and 125 per cent more than in 1918. Another increase in the postage rate is scheduled for July 1.

The zone system for postage charges on newspapers and periodicals is working a needless hardship on the press and its readers, and will have the effect of creating sectional lines in the country. It should be abolished.

National Convention Announcement

United States Independent Telephone Association to Hold 24th Annual Convention at Winona Lake, Ind., June 15, 16, 17 and 18—Operators' School, Plant School and Sports Program Are Among the Features Planned

Why the United States Independent Telephone Association is going to Winona Lake:

First: It was found that hotels in Chicago, as well as in other cities, are not only crowded to over-capacity, but with the rates now being charged for rooms, meals, etc., the cost to those who would attend, would be almost prohibitive. And that is not all—the association officers would not be able to secure sufficient reservations to properly accommodate their people, and the service, in all probability, would not be satisfactory.

Second: Winona Lake is one of the very few places available for holding the convention where exclusive hotel accommodations with capacity for 1,000 or more people could be obtained. There are four hotels on the grounds—The Winona, The Inn, The Westminster, and Kosciusko Lodge. The rates per day are $1 to $3.50, single, and $2 to $4.50 double. Extra cots in room, $1.25 per day each. There will be a cafeteria on the grounds where meals can be secured at popular prices. At The Winona and at Kosciusko Lodge, a la carte service can be secured all the time and a regular noon-day lunch will be served at 75 cents and an evening meal at $1.

Third: Winona Lake is located in the northeastern part of Indiana and is easy of access because it is situated on main lines of the railroads. The Pennsylvania Line runs along the north border of the park, intersecting the Grand Rapids & Indiana Railroad, the Lake Shore & Michigan Southern Railroad, and the Wabash Railroad at Fort Wayne, and the Lake Erie & Western Railroad at Plymouth.

Over the Pennsylvania system, Chicago lies 100 miles to the west and Fort Wayne 40 miles to the east. The Michigan division of the New York Central (Big Four Railroad) connects Winona with Indianapolis and other large cities on the south and extends into Michigan on the north. This railroad intersects the Erie Lines at Bolivar, the Wabash Railroad at Wabash, the Baltimore & Ohio at Milford Junction, the Wabash at New Paris, and the New York Central Lines at Goshen. The Winona Interurban Railroad extends from Goshen on the north to Peru on the south, a distance of 68 miles. This line passes through Warsaw. At Goshen this system connects with the Lake Shore & Michigan Southern Railroad, also electric lines for South Bend, Benton Harbor and other points north, east, and west. At Peru, it connects with the Wabash Railroad, Chesapeake & Ohio Railroad and electric lines, reaching Indianapolis, Cincinnati, Louisville, Terre Haute, St. Louis, and many other cities south, east, and west.

Winona Lake is also conveniently located for those residing in Indiana, Illinois, Ohio, and Michigan who would like to drive to the convention by automobile.

Fourth: Winona Lake offers splendid opportunities for recreation and outdoor sports of all kinds, such as boating, fishing, swimming, golf, tennis, baseball, etc.

The ladies will enjoy the park, as well as the program and the entertainment that will be available. About 100 ladies attended last year. Upwards of 300 are expected this year.

It is very important that requests for room reservations be sent to W. S. Vivian, secretary, 19 S. La Salle street, Chicago, now. If later one finds he cannot attend the convention, the reservation may be cancelled by sending proper notice. This procedure will greatly help those in charge of the program and will enable those planning to attend to know in advance just where they are to stay.

LABOR AND PROPERTY.

Property is the fruit of labor; property is desirable; is a positive good in the world. That some should be rich shows that others may become rich, and hence is just encouragement to industry and enterprise.

Let not him who is houseless pull down the house of another, but let him work diligently and build one for himself, thus by example assuring that his own shall be safe from violence when built.—From an address by Abraham Lincoln to a committee from the Workingmen's Association of New York, March 21, 1864.

Machine Switching for Bell System

Excerpts from an Article Descriptive of the New Machine Switching System to Be Installed by the Bell Companies in the Larger Cities—How a Typical Call Is Handled—the Apparatus Employed and Manual Similarities

By Bancroft Gherardi, *Vice-president and Chief Engineer*
and Harry P. Charlesworth, *Equipment Engineer, American Telephone & Telegraph Co.*

[EDITOR'S NOTE: Since the announcement about a year ago that the Bell company had developed a machine switching system and intended to make installations in a number of cities as soon as possible, a great deal of curiosity has been manifested as to its features and operation. A description of the equipment and its operation has just been given out by the Bell company and published in the various magazines of the associated Bell companies. Through the courtesy of the Bell Telephone News which supplied the illustrations, TELEPHONY is enabled to present the article. As this system has a number of features differing from those of automatic systems in present use, telephone men, generally, will be interested in this article.]

From the time of the earliest switchboards there has been a constant effort to perform various operations automatically so far as consistent with the service requirements, and many new features have been introduced from time to time for reducing the work required on the part of the operator. In line with these developments, telephone engineers early applied themselves to the problem of completing calls entirely without the aid of an operator. Many forms of automatic systems have been developed and tried out from time to time, but none of these satisfactorily fulfilled the complicated service requirements of large cities.

Arena Dr John, r, 2156 Bathgate av...FOR dham 4141
Arena Theatre, 623 8th av.....BRY ant 5409
Arend Ernest, A, Archt, 105 W 40....BRY ant 3231
Arend F J, 165 Bway.....COR tland 0940
Arend F J, r, 813 5th av.....PLA za 4226
Arends Katharine, MD, 178 W 97...RIV raide 0570
Arendt E, r, 156 W 86.....SCH uyler 2861
Arendt Edwd & Son, Leaf Tob, 151 Water..JOH n 1635
Arendt Ellis, 151 Water.....JOH n 1635
Arendt Simon, r, 29 E 129.....HAR lem 4202
Arengee Co, 21 W 4.....SPR ing 7224
Arens A, Leaf Tobacco, 182 Water.....JOH n 4747
Arens Miss Adele, r, 29 W 84.....SCH uyler 2493
Arens Burchard, Cafe, 520 8th av.....GRE eley 5141
Arens Edgmont H, Bookseller, 17 W 8.STU yvsant 0717
Arens F X, r, 119 W 80.....SCH uyler 6347
Arens Max, Lawyer, 271 Bway.....BAR clay 5786
Arensberg A, Drugs, 1002 So blvd....INT rvale 2925
Arensberg M, r, 961 St Nich av.....AUD bon 1520
Arensberg Walter C, r, 33 W 67.....COL mbus 4826

Fig. 1. Typical Examples of New Form of Listing Telephone Numbers.

Fig. 2. The Subscriber's Dial.

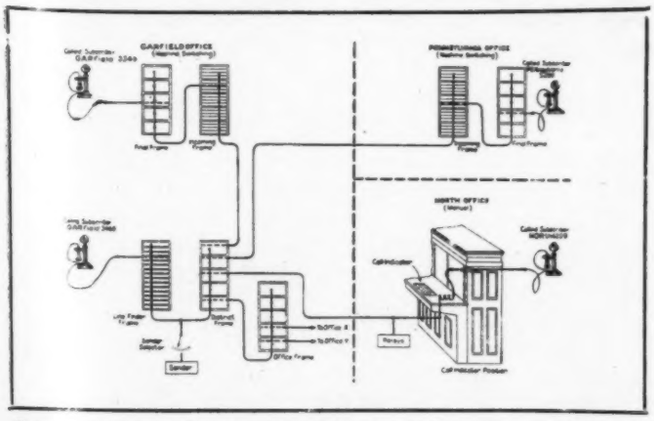


Fig. 3. Diagram Showing Progress of a Call from an Automatic Subscriber to Another Automatic Subscriber or to a Manual Subscriber.

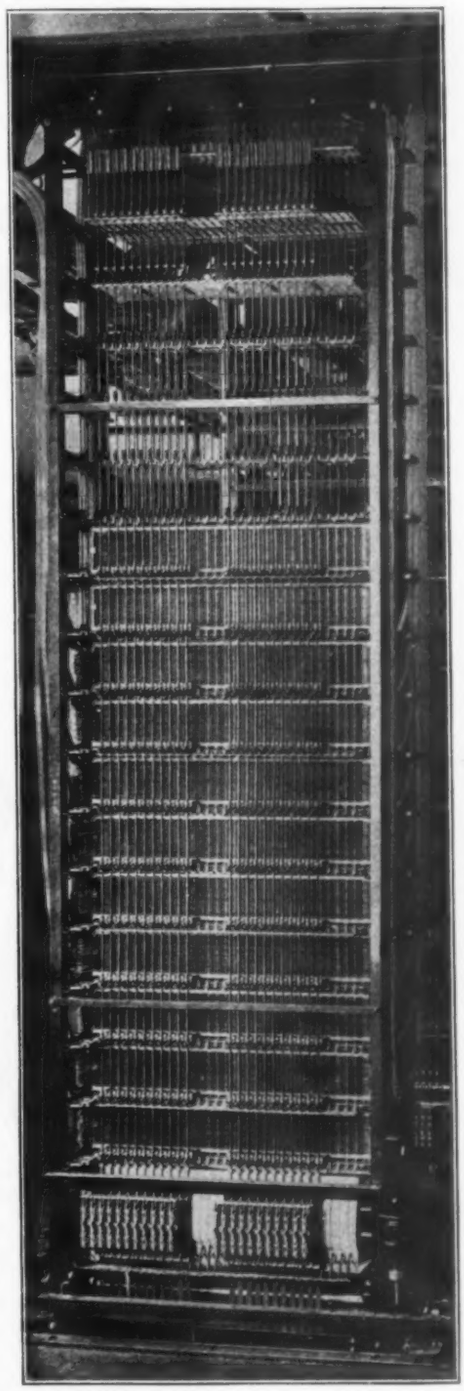


Fig. 4. Line Finder Frame Showing Multiple Banks and Selecting Mechanisms.

An indication of the magnitude of this problem may be secured when we consider that in New York City, for example, there are at present a total of nearly one million telephone stations served from about 90 central offices, and the predictions are that within the next 20 years the stations and central offices will have more than doubled. Each subscriber in this great network must be able to reach

promptly every other subscriber. Due to the large area involved a great number of calls within the city involve extra charges, which means that they must be specially supervised and ticketed.

There are many different classes of service furnished the public, such as measured rate, flat rate, official, coin box pay station, attended pay station, and other special services such as information, et cetera. Not only individual lines, but party lines and private branch exchanges must be cared for. Furthermore, demands for service to the extensive suburban area surrounding this great city, as well as to the vast number of cities, towns and rural communities throughout the entire country, require that provision be made for thousands of toll messages daily which must be recorded, supervised and timed.

It will be clear that the problem of producing machine switching equipment which will satisfactorily perform a sufficient amount of the labor involved in handling the foregoing service, so as to replace enough operators to warrant its existence, is not one that could be solved except after years of development work. It will also be evident that systems which might operate satisfactorily in cities of small or medium size, where service requirements are comparatively simple, would not meet conditions in these large metropolitan areas.

As a result of exhaustive investigations and long continued experiments, the engineers of the Bell system have produced an automatic switchboard which satisfactorily meets even the exacting service conditions just referred to. It may be interesting to note in this connection, that as a final step in the development of the system, three complete central office equipments of the machine switching type were installed at Newark, N. J.

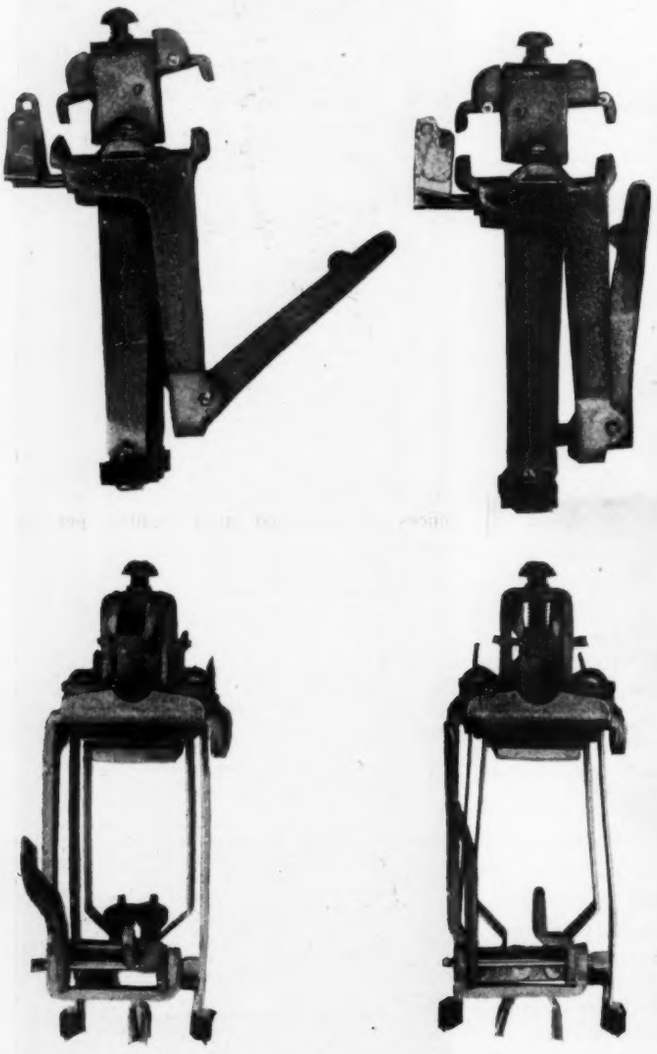
These installations were made on what is known as a "semi-mechanical" basis; that is to say, operators were employed to take the calls from the subscribers and transmit them to the machinery by means of numerical keys. It was thus possible to try out this form of apparatus without introducing any new method of calling on the part of the subscriber during the trial installation.

The results of these trial installations demonstrated conclusively that the new machine switching system would meet all the essential service requirements of our largest cities. The work of manufacturing equipment of this character is already well advanced and the first installations will be placed in service early in 1921.

For those not already familiar with our new machine switching system, we will describe briefly its fundamental and most interesting features.

The subscriber's station will be equipped with the usual form of telephone instrument and in addition with a calling device known as a "dial," which will be mounted at the base of the desk stand. This dial has ten finger holes bearing the numerals 1 to 9, and also 0 and the word "Operator" in the tenth hole. For the larger cities, the dial will also bear certain letters of the alphabet, while in the smaller cities numerals only may be employed.

In making a call, the subscriber will, of course, first refer to the telephone



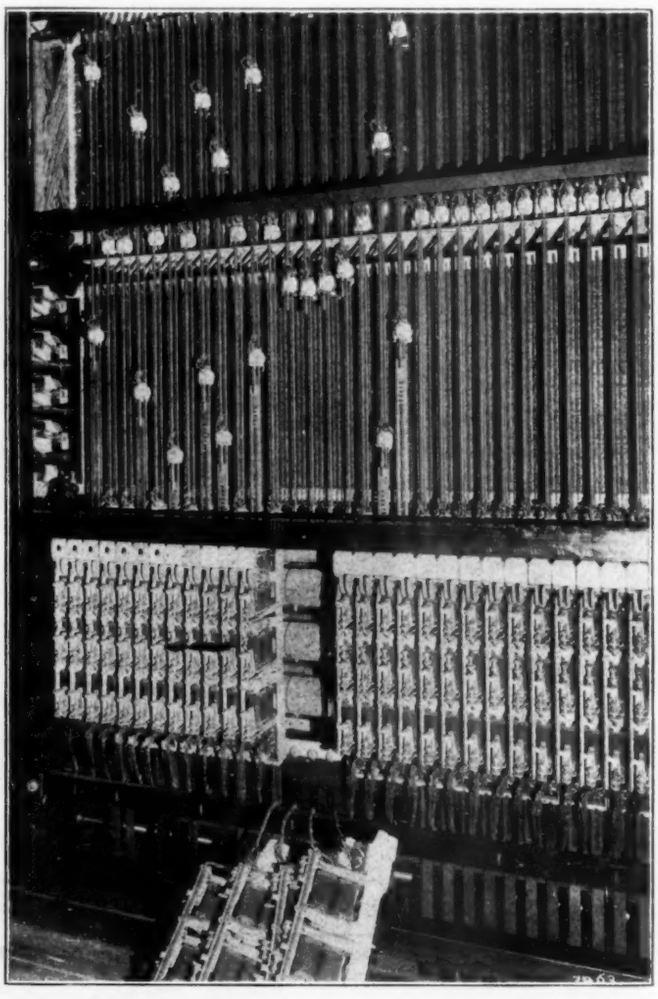


Fig. 5. Selector Multiple Brush Shown in Operated and Non-Operated Positions.—Fig. 6. Typical Selector Frame Showing Constantly Revolving Friction Rolls, Magnetic Clutches and Racks by Means of Which Selecting Mechanisms Are Moved Up and Down.

directory, but will find in the new directory that the central office name is printed somewhat differently than heretofore. Typical examples of the new form of listing telephone numbers are shown in the illustration, Fig. 1. As will be noted, these conform to the present manual listings, except that the first three letters of the office name are set out prominently.

Simple as this change in the form of listing appears, until it was developed by the Bell system experts no satisfactory system of designating telephone numbers for machine switching systems for large cities, such as New York, Chicago, Boston and Philadelphia, was known.

One of the unique advantages of the plan developed for designating telephone numbers is that it does not necessitate the abandonment of all of the existing manual listings. For manual operation it leaves the listing substantially as at present. For machine switching operation, the same form of listing is used, a clear indication being given in the directory, as to the portion of the listing which should be dialed in making an automatic call. Various other plans have been proposed, all of which either have involved serious objections, such as changing the whole system of manual designation or the use of combinations difficult for the subscriber.

Under the plan adopted, the dial as illustrated in Fig. 2 will carry the complete alphabet with the exception of two letters (in this case "Q" and "Z"), in addition to the ten numerals. The letters omitted will be those infrequently used and, therefore, not required in the first three letters of central designations.

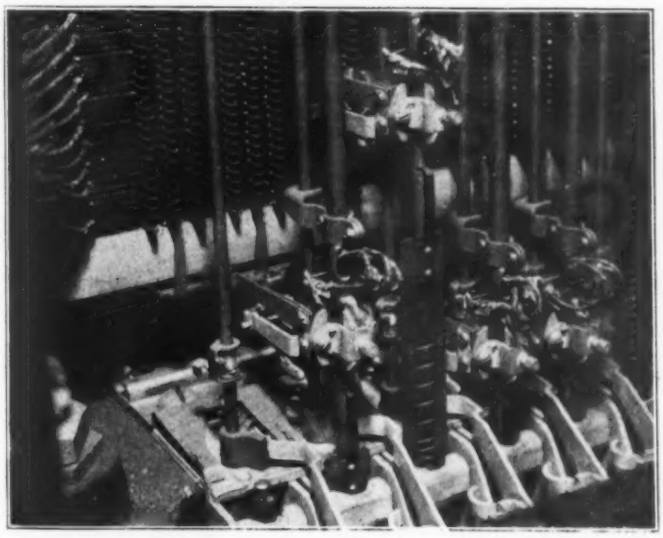


Fig. 8. Selector Frame Showing Details of Multiple Bank, Multiple Brush, and Part of Control Mechanism.

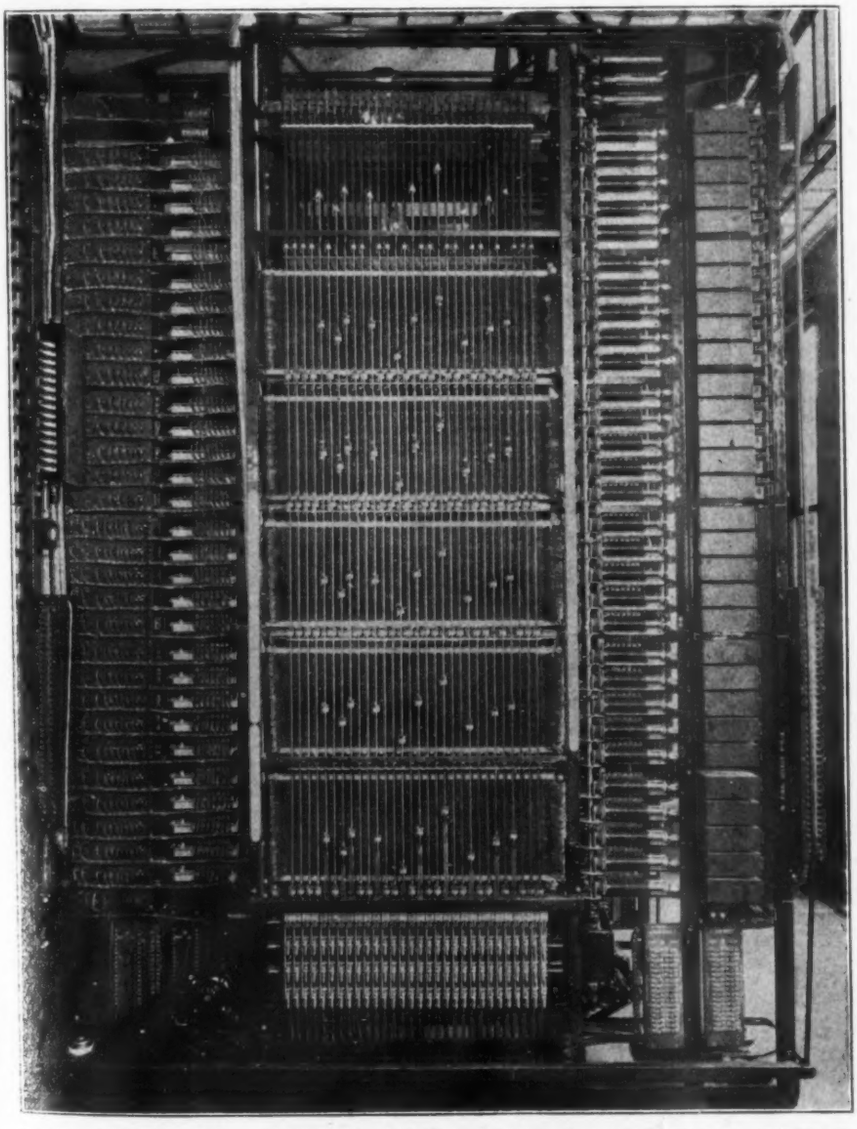


Fig. 7. Typical Selector Frame Showing General Arrangement of District, Office, Incoming and Final Frame.

Under this plan, machine switching calls are passed to the central office mechanism by dialing the first three letters of the office name and then the four numerals, followed by the party line designation, if any. On calls to machine switching offices there will be no party line letters to dial, as these offices are arranged on a terminal per station basis.

In medium size multi-office cities where six-digit calling is practicable, only the first two letters of the office name will be given prominence in the directory. In very small multi-office cities where five digits only are required, the telephone number may consist simply of five numerals and no letters may appear on the dial.

Having secured the desired telephone number from the directory, which we will assume to be "PENnsylvania 5280," the subscriber will first remove the receiver and listen for the "dial tone," which indicates when the apparatus is ready to receive his call. He will then insert his finger in the opening of the hole over the letter "P," rotate the dial until the finger comes in contact with the metal stop shown in Fig. 2 and release the dial, which will automatically return to normal. He will then repeat this operation for the letters "E" and "N," and in turn for the four numers 5-2-8-0.

We will now describe briefly the progress of the call through the major pieces of apparatus. As will be seen from the diagram, Fig. 3, the line of the calling subscriber, whom we will assume to be a subscriber in the "GARfield" office, appears at a so-called "line finder frame." When the receiver is removed from the switchhook preparatory to dialing, the line is selected by a "line finder" and connected to an idle "sender" by means of a "sender selector." Upon completion of

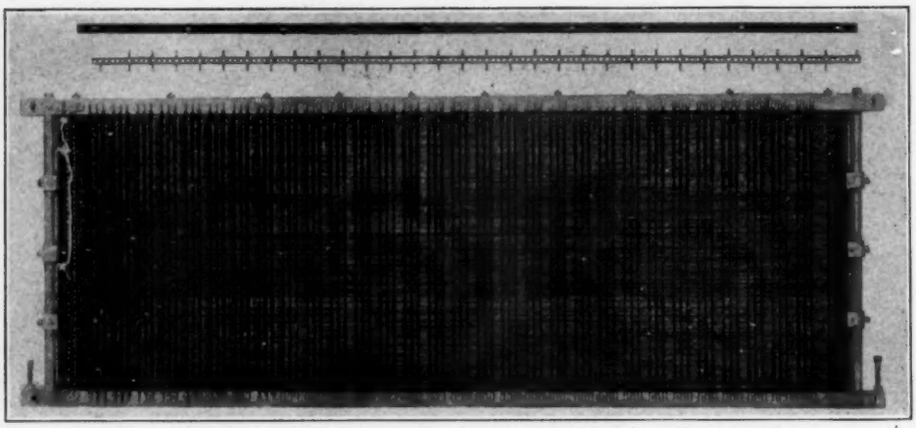


Fig. 9. Multiple Bank Showing Individual Insulating and Terminal Strips.

these operations, which take but a fraction of a second, the "dial tone" is sent out to the calling subscriber, as previously mentioned.

When the subscriber dials, the electrical impulses (on a decimal basis) are transmitted to the "sender," which receives and registers them, in turn translates them to the proper basis for the control of the apparatus, which is not operated on the decimal system, and then governs the selection through the apparatus as referred to below. If the subscriber, for any reasons, should fail to dial the full number, the selection, as described later, would not be completed, but the call would be taken up by a maintenance employe and the subscriber advised of his error in case he had not already hung up and dialed again.

The "sender" automatically causes the particular "district selector" which is permanently associated with the "line finder" originally used, to start up and select a trunk to the office desired, namely, "PENnsylvania," either directly or through an "office selector" in case the number of trunk groups is too large to be placed on the "district selector."

Assuming that the "PENnsylvania" office is on an automatic basis, the trunk chosen will terminate an "incoming selector" frame and the "sender" will cause the call to be routed through the "incoming selector" to a "final selector" and thence to the particular line desired. When the connection is thus completed, audible signals will be sent back to the calling subscriber to indicate that the station is being rung or that the line is busy. If the line should be out of order, the connection would be automatically completed to an operator who would so advise the calling party.

If the call had been for another subscriber in the same office, namely, GARfield, instead of in the PENnsylvania office it will be noted that the call would be routed from the "district selector" to an "incoming selector" in the same office and thence to the particular "final selector"

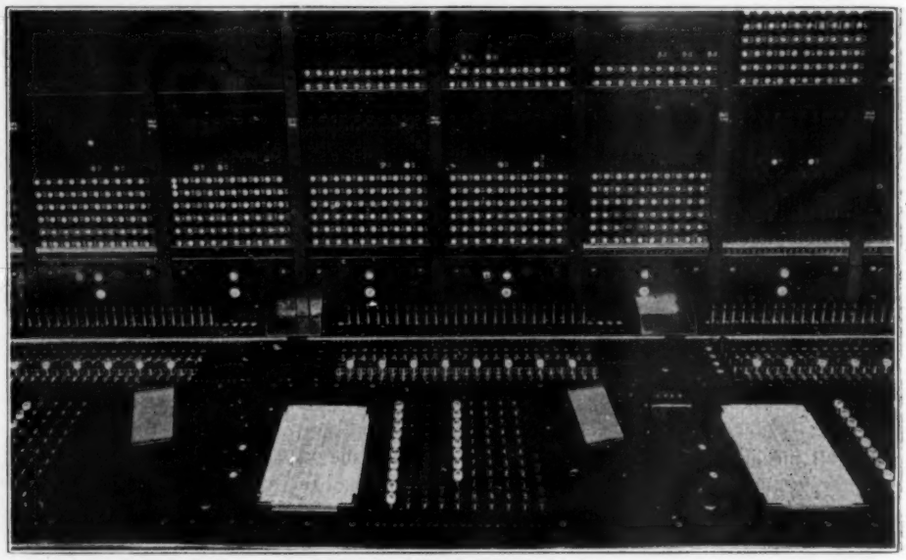


Fig. 12. Manual Position in Automatic Office Arranged for Semi-Mechanical Operation.

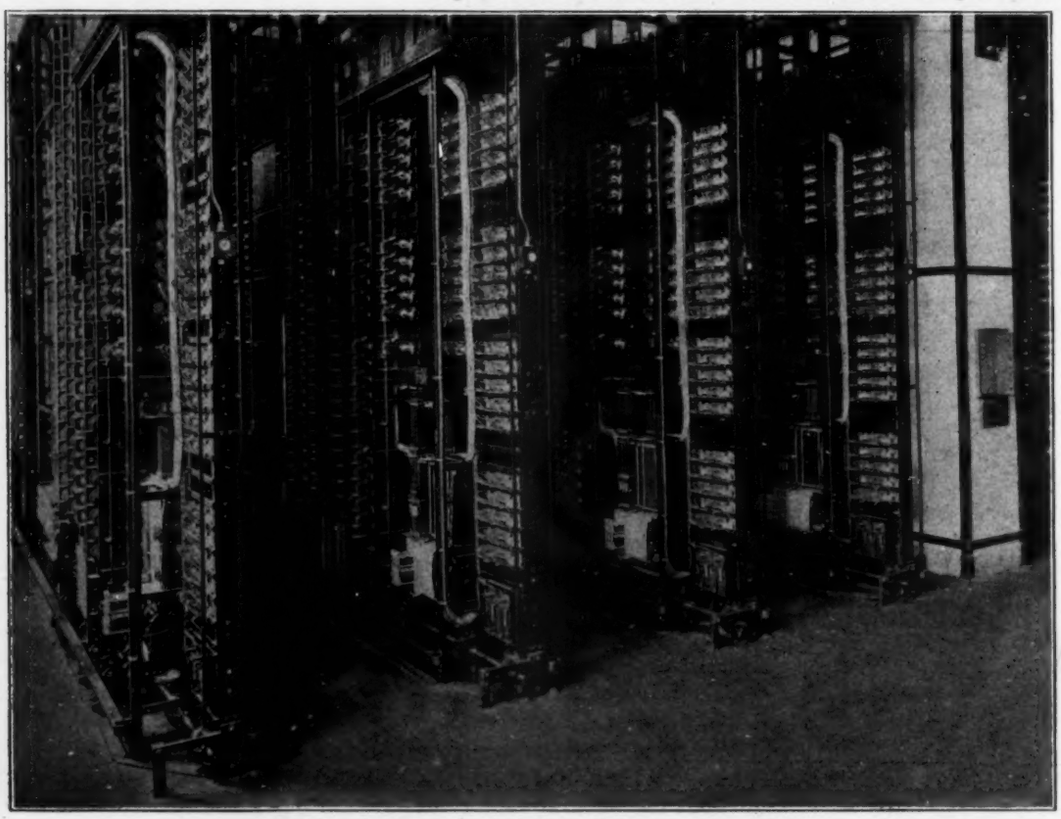


Fig. 10. General View of Machine Switch Installation.

Fig. 14. Typical Installation of Cordless B Positions in a Machine Switching Office.

in which the desired subscriber's line is located.

As soon as the subscribers have completed conversation and hung up their receivers, the connection through the automatic machinery is immediately disconnected and the apparatus returns to normal.

Those familiar with the manual switchboard will doubtless be impressed, from the description given of the completion of a call, with the rather striking similarity of the progress of a call through the full mechanical and manual systems. It may be interesting, therefore, to carry this comparison further. As mentioned, aside from the dial, the automatic and manual subscribers' telephone sets are very similar.

With the manual system when the subscriber removes his receiver from the hook it causes the apparatus to light a lamp associated with the answering jack. The operator, on noting the light, takes up a cord and plugs in. With the mechanical system, the removal of the receiver causes a "line finder" to take up the subscriber's line in readiness for the next operation.

With the manual system, the operator next throws a listening key and notifies the subscriber she is ready to receive the call by saying "Number, please?" With the mechanical system, the "sender selector" proceeds to attach an idle "sender" and this "sender" indicates to the subscriber that it is ready to receive the call by sending out the "dial tone."

With the manual system, the subscriber next gives his order orally to the operator. With the mechanical system, the subscriber, by means of the dial, gives the number electrically to the "sender" by dialing the letters and numerals of the number as already described.

With the manual system, the operator knows from the office name that has been given the proper routing of the call. She gives the number desired to the incoming operator

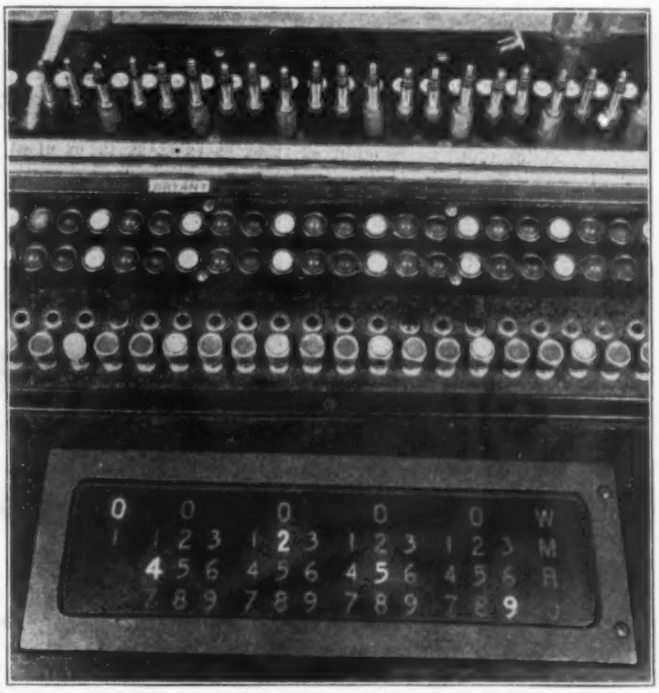
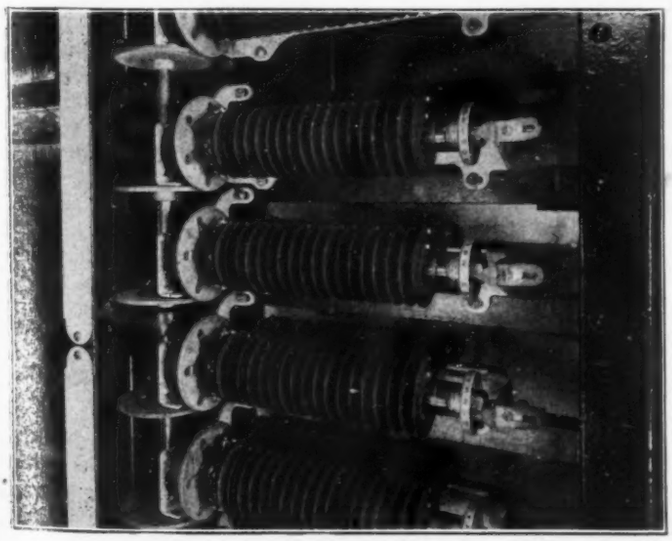


Fig. 15. Call Indicator at an Incoming Trunk Position in a Manual Office Showing Number 4259 Displayed.



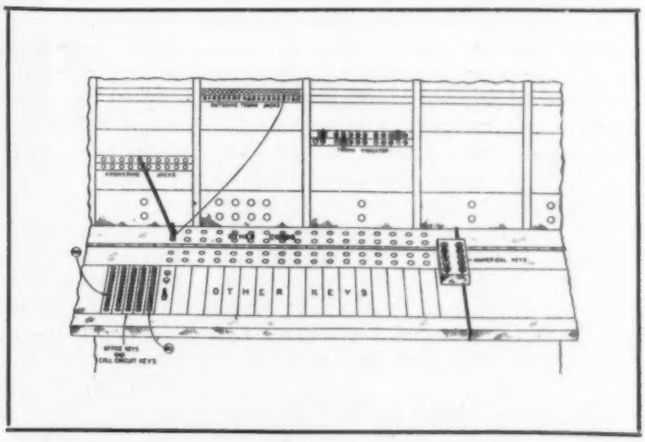


Fig. 11. Sequence Switches Mounted Showing Constantly Revolving Drive Shaft and Magnetic Clutches by Means of Which the Sequence Switches Are Revolved.—Fig. 13. Position in Manual Office Equipped With Numerical Keys for Completing Calls to Automatic Offices.

("B" operator) at the distant office, obtains a trunk and connects it with the calling line by plugging in with the other cord of the pair she previously used in answering. With the mechanical system, the "sender" upon receiving the office code from the subscriber's dial, recognizes its significance and causes the "district selector" to select an idle trunk leading to an "incoming selector" at the desired office.

With the manual system the incoming operator at the distant office locates the desired subscriber's number in the multiple before her. She tests the line to see if it is busy and if it is not busy, she inserts the plug of the incoming trunk in the multiple jack and the ringing is started automatically. If the line is busy, she plugs the trunk into a jack which sends back the busy signal.

With the mechanical system, the "sender" causes the "incoming selector" to locate the group of trunks leading to the "final selector" caring for the particular 500 lines in which the desired number is located, and causes the "final selector" to locate the line desired. The "final selector" tests the line to ascertain if it is busy and if it is not, establishes the connection and ringing is started automatically. If the line is busy the selector will not establish the connection but will give a busy signal to the calling subscriber.

Illustrations of the various pieces of apparatus which we have referred to are shown in Figs. 4 to 10. For installation in the largest cities, the "translator," which forms a part of the sender, consists of a selector similar in general to the selectors illustrated.

A detailed description of each unit employed would, of course, be impracticable in this connection but we will refer very briefly to one or two items of equipment which are of exceptional interest.

Glancing at the photographs of the typical selector frames, Figs. 6 and 7, it will be seen that these frames are made up of "banks" arranged to accommodate 100 circuits. It will also be noted that five of these "banks" are provided one above the other. Rods are furnished equipped with five "multiple brushes" which travel over the contacts of the "banks," the rods being elevated by means of rollers at the base of the frames. These rods, with their multiple brushes and control mechanisms, Fig. 8, constitute what have been referred to as "selectors."

The "banks" shown in Fig. 9 are interesting in that they correspond closely to the multiple in the ordinary manual switchboard. That is to say, lines or trunks are connected to the multiple terminals on the "bank" in much the same manner that they are connected to the multiple jacks in the manual switchboard.

Another very interesting piece of apparatus is the "sequence switch," as shown in Fig. 11. This switch is probably one of the most ingenious devices involved in the mechanical system and performs in a very simple manner what had previously been accomplished by the utilization of large numbers of relays.

Its use has also made possible a more positive timing of event than could otherwise be obtained. For example, if it were essential for a certain circuit to be closed just before some other circuit, it is simply a matter of cutting the "cams" on the sequence switch, a sample of which is shown in the photograph, in a certain way, and the order of events is assured. By this simple device, therefore thousands of combinations of operations may be established at will.

It will also be interesting to note that the various machines are not, in general, "stepped" along by the electrical impulses but are power-driven, the "selectors" being started and stopped at the desired trunk or line, in accordance with the electrical impulses which are always under control of the "sender."

While regular calls between two subscribers will be completed under the new system without the aid of operators, certain classes of calls, such as toll calls to suburban points and calls for discontinued or changed numbers, will require the assistance of an operator. Special manual positions will, therefore, be provided in the automatic offices for this service. These positions will also care for cases where subscribers desire, for any other reason, the assistance of an operator. In such cases the subscriber will use the hole of the dial marked "Operator."

The manual positions will also be used for the handling of traffic from coin boxes when these are operated on a manual basis. In certain of the automatic offices, centralized information desks will be provided for furnishing the various classes of information required by the public. In some machine switching offices, so-called "cordless B" positions will also be provided initially, to care for calls from the existing manual offices as described more in detail later.

The manual positions installed in the automatic offices for handling toll calls to suburban points, as well as for completing connections from pay stations, etc., will, in general, be operated on a "semi-mechanical" basis; that is to say, the operator will be provided with numerical keys for completing the connection to the mechanical apparatus.

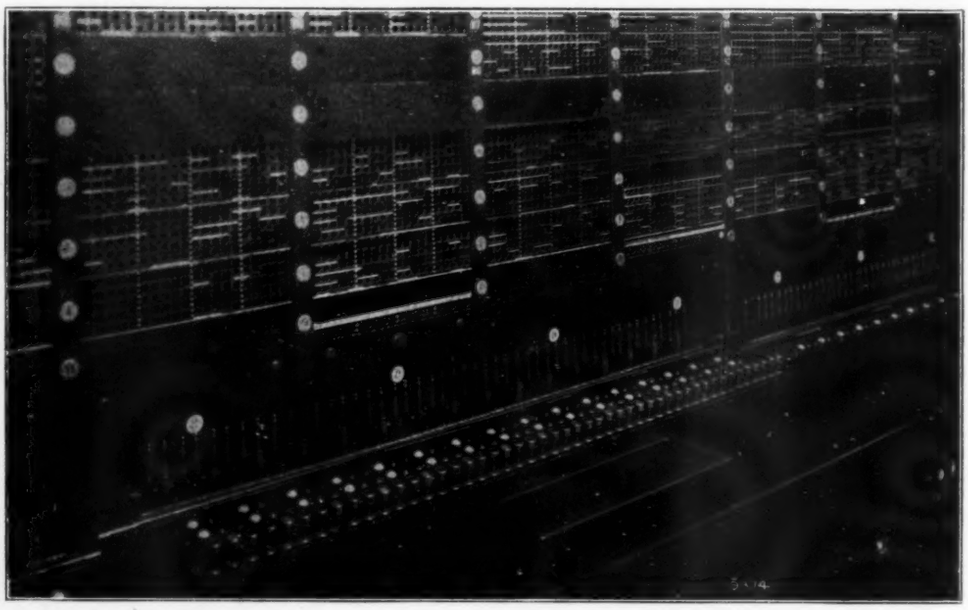


Fig. 16. Incoming Trunk Position in a Manual Office Arranged for "Call Indicator" Operation.

By setting up on her keyboard, Fig. 12, the first three letters of numerical code of the office desired, followed by the numerals and party-line letter, if to a manual office having such party-line service, the call will be completed automatically to the desired office, and if the latter is of the machine-switching type, automatically through the switches to the called subscriber's station. If the distant office is operated on a manual basis, the call will appear before an incoming operator at that office on a "call indicator," as described later.

As the semi-mechanical operators will be unable to readily identify the calling subscriber, as is possible today due to his line terminating directly before the operator on an answering jack, a so-called "checking multiple" is provided at the semi-mechanical positions. On suburban calls the operator may thus readily check the calling number as given by

the subscriber, and insure accuracy in the billing record.

In connection with the introduction of automatic switchboards, the question naturally occurs to one not familiar with the system, as to how calls are to be completed from a mechanical office to a manual office or vice versa.

The automatic system has been so carefully worked out, and the methods of connecting it with the other types of switchboards have been so perfected, that the different forms of equipment will interconnect without difficulty. In fact, a subscriber connected with one of the new automatic switchboards does not need to know whether the subscriber he is calling is connected with another automatic or with a manual switchboard. Conversely, a subscriber connected to a manual switchboard does not need to know which type of switchboard the party he is calling is connected with.

Considering first calls from a manual to an automatic office, one of two general methods will be employed, depending on the particular conditions encountered. Where the volume of traffic to automatic offices is considerable, or the manual switchboard is to remain in service for a reasonable period, the position will be equipped with a ten-button key, as illustrated in Fig 13, and on receipt of a call, the operator will select the office desired by means of one of the keys formerly used as calling circuit key.

This operation will automatically select a trunk to the automatic office and will indicate the number of the trunk chosen by lighting lamps in the face of the switchboard before the operator. She will then play off the telephone number desired on the ten-button key, take up the trunk indicated with the other end of the cord pair with which she answered the calling subscriber and the connection will be completed automatically through the switches at the automatic office to the subscriber's station desired.

In special cases where the volume of traffic to automatic offices is small or the manual switchboard is soon to be replaced due to it becoming inadequate, the operator will complete the call over a calling circuit to an incoming operator at the machine switching office in the same manner as she would to another manual office. The incoming operator occupies what is known as a "cordless B" position, Fig. 14, since it has no cords, and she simply completes the connection through the mechanism by playing off the desired number on a set of keys before her, which resemble in some respects, the keys of an adding machine.

On calls from automatic to manual offices, the automatic subscriber will dial the number in the same manner as he would in making a call for another automatic subscriber, but the machinery will select a trunk to the manual office (see Fig. 3), and light a lamp associated with the trunk, indicating to the incoming operator that a call is waiting. The operator will then depress a key associated with the trunk and the number dialed will be displayed in lamp signals before her.

The displaying of the number will be accomplished by a device known as a "call indicator" corresponding somewhat to a "carriage call," but which differs materially in its arrangements as shown in Figs. 15 and 16. The call is thus received visually and not orally by the incoming operator. Upon noting the trunk selected and the number displayed on the indicator, the operator completes the connection to the desired line in the multiple before her.

If the line is found busy, she inserts the plug of the incoming trunk in a busy back jack, sending back the busy signal to the calling subscriber. The machinery has been so designed that when more than one call is received at the same time at these incoming positions, the additional calls are stored up in the mechanisms and in turn displayed on the indicator as the operator has disposed of the preceding calls.

The "tandem" toll boards, now operating in most of the large cities on a manual basis, will be replaced by machine switching equipments. In some instances, the through call will be completed entirely by the automatic equipment, while in other cases the services of an operator will be required for completing the call from the tandem point.

In the case of the toll boards at which calls to long distance or other points beyond the suburban area are completed, no radical changes will be required at the present time. It appears that the only changes necessary will be to modify the recording trunks from the local offices over which the subscribers pass their toll calls, also to arrange for the toll operators to secure connection with subscribers' lines in the automatic offices. To establish such connections, one of the two methods outlined for handling calls from manual to automatic offices will be employed.

The introduction of machine switching central offices will not require any radical changes in the equipment or operation of private branch exchanges. The private branch exchange positions must, however, be equipped with calling devices to permit of the operator completing out-going calls and the circuits must be so arranged as to function properly with the automatic central offices.

These changes in the private branch exchange equipment will, in some instances, be made without removing the switchboards, while in other cases, particularly on the smaller installations, new switchboards having the desired features will be installed and the boards removed will be utilized in districts having manual central offices.

From the brief description of the machine switching system which we have given, it is evident that the introduction of this new form of telephone equipment and service will involve a vast amount of work on the part of all departments in the Associated Bell Companies. As with any great project, this cannot be accomplished without a full concentration of effort and all departments must perform their functions in a most thorough and co-operative manner.

It will be apparent, therefore, that new and interesting fields of endeavor have been opened up for every employe in the Bell system, for whether a member of the traffic, plant, commercial, engineering, accounting, or other organization, the introduction of machine switching operation will present to each some new and interesting problems which must be solved.

Although the use of machine switching equipment will not make it necessary to continually add such large numbers of operators to the force as heretofore, the constant growth in the system and the need for operators to cover the special positions in the machine switching offices and in the toll boards, will evidently require the services of our operators.

They Use "Telephony."

Under date of April 13, John F. Davies, general manager of the Interstate Utilities Co., of Spokane, Wash., writes:

"We appreciate 'Telephony' and the best evidence of that fact is that we place it in the hands of each one of our managers, and also frequently call the attention of our chief operators and other employes to articles of special interest as they appear in the various issues."

The Interstate company operates exchanges at Ione, Wash., and Bonners Ferry, Coeur D'Alene, Harrison, Kellogg, Mullan, Post Falls, Priest River, Rathdrum, St. Joe, St. Maries, Sandpoint, Spirit Lake and Wallace, Idaho.

Company to Increase Stock from $150,000 to $500,000.

The Platte Valley Telephone Co., operating out of Scottsbluff, Neb., and covering the irrigated section of that state and a part of Wyoming, has just completed the necessary steps to increasing its authorized capital from $150,000 to $500,000. F. Alexander is president and H. M. Carmean, secretary of the company.

Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Citizens Independent Takes Over Bell at Terre Haute.

The Indiana Public Service Commission, in an order issued Friday, April 23, authorized the Citizens Independent Telephone Co. of Terre Haute, to purchase the holdings of the Central Union Telephone Co., in that city. Another order issued by the commission established new rates for the enlarged company.

The deal whereby the competing telephone systems of Terre Haute will be merged was tentatively made more than one year ago, when permission of the commission was asked for the purchase by the Citizens Independent company of the plant and business of the Central Union.

Proceeding on an assumption that the purchase would be authorized, the Citizens company has been at work for some time making arrangements for the transfer which will now be concluded at an early date. No official information has been given out as to the probable date when the systems will be cut over into one exchange, but it is understood the unification will be made soon.

The new single line business rate is $6 a month; two-party line, $5; single line residence, $2.75; two-party, $2.25; four-party, $2; eight-party rural business, $3; residence, $2. The new rates are to yield a 7 per cent return on a new aggregate valuation estimated tentatively at $1,600,000.

Commissioner Fred B. Johnson dissented from one part of the order, although concurring in the principal part and favoring the consolidation. He asserted that the order permits the refunding of 6 per cent of $602,400 of refunding and extension bonds now outstanding at 5 per cent, and not due until 1936, and asserts that this will result in patrons of the company paying $6,200 a year more interest for 16 years.

The business of the combined company will be handled from the Citizens company's own building.

Sustains Rule Prohibiting Use of Telephone Attachments.

Sustaining as reasonable a regulation of the New York Telephone Co. prohibiting the use of any equipment other than that furnished by the company, the New Jersey Public Utility Commission has dismissed a complaint by which the Quick Action Collection Co., of Newark, sought to restrain the telephone company from discontinuing its service.

The controversy between the company and the collection agency resulted from the use by the latter of a patented appliance whereby it was made possible for a person using the telephone to make use of both hands in holding manuscript, writing or otherwise. This device necessitated removal of parts of the apparatus provided by the telephone company and the substitution of other parts. The telephone company contended that, in addition to being a violation of its rules, the device installed impeded the telephone service. The collection agency, on the other hand, submitted that the device facilitated its work as a patron of the telephone company and that the prohibitory regulation of the company against the use of any apparatus other than its own was unreasonable.

In supporting the rule of the telephone company the commission said it has been generally conceded that utility corporations have a right to adopt and enforce reasonable rules and regulations. Giving full consideration to all the factors in the case, the commission said the regulation limiting the use of apparatus to that furnished by the company was obviously a reasonable and proper one.

Message Rate Charged by Little Rock Hotel Held Unlawful.

It is unlawful to charge 10 cents for a telephone call originating in a room in the Hotel Marion and destined to a point on the line of the Southwestern Bell Telephone Co. within Little Rock, according to a recent decision of the Arkansas Corporation Commission, following an investigation of charges made by the Hotel Marion for room telephone calls to points outside the hotel.

Two hearings were conducted before the commission. The hotel maintains approximately 466 telephones in the rooms of the hotel, for which a monthly rental of 50 cents each is charged by the Southwestern Bell company. A P. B. X., furnished by the telephone company, is maintained in the hotel office. The wiring is the property of the hotel company, which also employes five telephone operators and one supervisor.

In an effort to meet increased cost of wages paid to the telephone employes and an increase of rental for telephone sets, from 25 cents to 50 cents per set, during the past year the hotel company has charged 10 cents for each telephone call from a room in the hotel to a point anywhere within the city, instead of five cents allowed on local messages from a public telephone, according to the general exchange tariff of the telephone company. This charge the commission has ruled to be illegal and it has been ordered discontinued.

The commission based its decision on the fact that the Hotel Marion is charging for a service over the lines of a public utility and is assessing a rate higher than the rate that the utility has on file as the legal rate. The cost of the undertaking does not enter into the disposition of the matter, the commission ruled, as the hotel company is not engaged in the public service and of itself has no legal right to make a charge of this kind. The decision of the commission, it was said, is practically the same as that rendered in similar cases by the New York Public Service Commission in re: New York Telephone Co., Case No. 2830, June 6, 1916, P. U. R. 1916-D, page 688, and the case of J. C. Connelly vs. New York Telephone Co., March 16, 1920, dealt with by the New York Public Service Commission.

Rate Petition Withdrawn Pending Survey and Valuation.

The hearing of the petition of the Seymour Mutual Telephone Co., Seymour, Ind., for authority to increase rates, which was to be held last week, has been postponed indefinitely as a result of a request sent to the Indiana Public Service Commission by the petitioners.

The company will ask the commission to make a survey and valuation of its property in order to arrive at a sound basis of valuation, upon which a just and equitable schedule of rates may be based, before the petition is pressed for a hearing.

The only reason this has not been done long ago is, because the commission is far behind in its field work, and it will be several months before men are available to do the work. The pressing necessity of the company, operating on a schedule far below actual revenue producing requirements, made it necessary to ask for some relief, which was partially granted in the present rates, but which, according to the company's claims, are yet insufficient to meet the actual requirements.

However, the company feels that it would rather make the sacrifice than to push for higher rates until the public is absolutely assured of the actual need, and this can only be obtained after the commission has established a true basis of

valuation for rate making purposes. The position assumed by the company was voluntary on its part, and was taken only after consideration of the need of definite information, which is unassailable, upon which the justice of its claim may rest. The plant is valued at $76,000 for rate making purposes, and the company insists the appraisement should not be less than $140,000.

Free and Reduced Rate Service Ordered Discontinued.

The Greenfield Telephone Co. of Greenfield, Ind., has been ordered by the Indiana Public Service Commission to discontinue free service to the city and special rates to city employes and others. The increased exchange rates ordered are as follows:

Business, individual, $2; residence, individual, $1.75; party line, $1,25; rural individual, $1.75, plus a line charge of 25 cents for each one-quarter mile beyond the city limits. The company was also directed to improve its service.

Rate Increase Granted at Decatur and Berne, Ind.

The Citizens Telephone Co., of Decatur, Ind., has been granted an increase in rates by the Indiana Public Service Commission. The new rates apply at Decatur and Berne.

At Decatur the new rates are as follows: Individual business, per month, $2.50; individual residence, $1.50; party residence, rural, $1.50; extension telephone, business, $1; extension, residence, 50 cents; extension listing, 25 cents; extension bell, 25 cents.

The rates at Berne are as follows: Individual business, $2.50; individual residence, $1.35; party residence, rural, $1.35; extension, business, $1; extension, residence, 50 cents; extension, listing, 25 cents; extension bell, 25 cents.

Higher Telephone Rates Authorized at St. Jacob, Ill.

The Home Telephone Co., operating 187 telephones in St. Jacob and vicinity, is authorized by the Illinois Public Utilities Commission in an order handed down April 6, to increase its net annual rates as follows:

	Old	New
Individual business	$24.00	$27.00
Two-party business	18.00	21.00
Individual residence	18.00	21.00
Two-party residence	12.00	15.00
Rural party line	12.00	15.00
Extension bells	1.80	1.80
Desk telephones, in addition to regular rate	3.00	3.00

The plant operated by the Home company of St. Jacob is of the magneto type, with metallic circuits in the town and grounded circuits in the country. The reproduction cost, new, including supplies and materials, was found by the commission to be $14,558, and the reproduction cost, new, less depreciation, $8,412.

The company is ordered to set aside a monthly allowance of $55, to provide a reserve against depreciation, plus 6 per cent per annum of the cost of all additions that may be made to plant in the future.

Rate Agreed Upon for Telephones in Fraternity Houses.

A special rate of $3 a month for telephones in fraternity houses has been agreed upon by the Lafayette Telephone Co., and representatives of fraternities at Purdue University at Lafayette, Ind.

The telephone company petitioned the Indiana Public Service Commission several months ago for authority to charge fraternities the regular business rate of $3.50 a month, and on being refused, asked for a rehearing of the case. The new rate was finally agreed on at a meeting last week, which was attended by J. W. McCardle, of the public service commission.

The new rate was made effective from January 1, 1920, and will be in force until September 1, when the fraternities may again bring up the matter to determine whether they shall be charged the residence rate of $2 or the business rate.

Telephone Disconnected Because of Use of Vile Language.

Although ordering the Farmers & Merchants Telephone Co., of Minerva, Ohio, to restore service to one of its subscribers whose telephone had been removed because of the use of profane and vulgar language, the Ohio Public Utilities Commission held, in a recent ruling, that the company was entirely within its rights in disconnecting the instrument. Service is ordered restored with definite understanding that a repetition of the offense will warrant the company from permanently withdrawing its service.

The complainant in this case, the Minerva & Canton Transit Co., is engaged in transporting persons and property for hire by auto buses between the town of Minerva and the city of Canton, a disance of 22½ miles. In conducting this business it was the custom of the general manager to call the farmers' residences along the route and in that way keep in touch with the operations of his business.

On February 17, 1920, the telephone company disconnected the telephone of the transit company on the ground that the manager on that day and over a period of about three years prior thereto, habitually used profane, vulgar, indecent and obscene language over the telephone and that when he did not receive as prompt service as he thought he was entitled to, was in the habit of cursing the operators.

Upon the disconnection of his instrument, the manager filed a complaint with the commission and requested that the company be ordered to restore his service.

As the findings of the commission will be of interest to other telephone managers, they are quoted in part, as follows:

"The depositions of 28 witnesses were taken, at least 10 of which testify that they had heard the manager cursing either themselves or others over the telephone, and that he is accustomed to pouring forth his vials of wrath over the wires when things do not go to suit him.

"Other witnesses testify that they have heard him talk frequently over the telephone and that they never heard him use profane or vulgar language when so talking; but where a telephone is used a hundred times a day over a period of three years, the testimony of witnesses who did not hear him use improper language weighs but little against the testimony of those who did and who had been the objects of his wrath.

"Both may have been entirely truthful in their statements and they would not be inconsistent, for out of the multiplicity of calls, there were doubtless many which were made when these witnesses who testify they did not hear him use improper language, were not present.

"We think the testimony clearly shows that over a period of three years the manager of the transit company had been in the habit of swearing at the operators when he did not get quick service, and cursing others with whom he talked, and that on the 15th day of February, 1920, he called a female operator vile and obscene names, reflecting upon her character and wounding her feelings insomuch that the operators demanded of the telephone company that it disconnect the telephone used by the manager of the transit company as a condition of their remaining in the company's service.

"The operator in question seems to have been one of the oldest and most skilled of the force, and in view of the efforts she was making in his behalf on said 15th day of February, 1920, there seems to have been little occasion for this outburst of fury. A blizzard was raging and some of the buses were belated, and the manager was attempting to locate it, but that was not the only thing which was out in the storm, and he was not the only person who was trying to get calls through.

"In view of the excessive demands which the transit company continually made for service, and in view of the fact that other subscribers are entitled to equal use of the lines, it would seem that even in this emergency, the operator was giving the transit company at least a due share of attention.

The Dial is the remedy for the present inadequate service

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

AS the public clamor over poor telephone service increases, the service grows worse and worse. Efforts to remedy conditions are to a large extent futile for the simple reason that it is impossible, under present conditions, to get and keep a sufficient number of operators.

All kinds of inducements are being offered—unheard of wages, bonuses, free luncheons, recreation facilities—but they can't get enough girls.

The only way to effectually and permanently assure adequate service is by installing Automatic—the system that does away with operators and all the problems connected with them.

The cities where the Dial is in use are enjoying the same accurate, dependable service that they have in the past while other cities vie with each other in claiming to have "the rottenest telephone service in the country."

Such conditions largely account for the unprecedented number of orders we are receiving for Automatic Equipment.

AUTOMATIC ELECTRIC CO.
CHICAGO

COLUMBUS OFFICE
1120 Columbus Savings & Trust Bldg.

FT. WAYNE OFFICE
502 Bass Block

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

"The manager testifies that he called all the points beyond Waynesburg and other people on the telephone and in these calls he seems to have been given prompt service. He then put in a call for one Dick Thompson and several times received an answer from someone over in the village of Malvern. This is what aroused his anger and called forth his withering vituperations. He says that thereafter, on the same day within a half an hour, he put in a dozen calls and got prompt service.

"It appears that the transit company had already had at least a half dozen calls, all of which were made promptly, but because the call for Mr. Thompson was not prompt, owing, as the operator says, to certain mechanical defects over which she had no control, and because the operator would not give him a monopoly of the service to the exclusion of others, he cursed her and called her vile names.

"If all users of telephones could stand for a little while in a busy exchange and see the operators at work, they would realize what an exacting and nerve-wrecking task they have to perform, and would become a great deal more charitable in their criticisms.

"In a telephone company having 1,000 subscribers, there is possibility, though not a probability, that 999 of them might want the same number or the same line at the same time, and if it had 60,000 subscribers, 59,999 might want the same service of line at the same time.

"While that condition is not likely to occur, there is always a probability that several parties may want any given number or line at the same time, and each must wait his turn, otherwise a telephone service would be of no value. There is also a probability that out of a large number of lines and instruments, some inevitably will be out of order.

"While it is extremely provoking to have an incompetent or careless operator at the switchboard, it is far more often the rush of business or some temporary defect in line or instrument over which the operator has no control, that causes slow or inefficient service. The occasional misconnection in a well-regulated office is very small in comparison with the thousands of proper connections, and one who uses a telephone a hundred times a day, has little cause of complaint if there is an occasional lack of prompt service.

"But did the conduct of the manager of the transit company warrant the telephone company in disconnecting the service? We think it did. Such conduct, and especially when persisted in, is reprehensible and inexcusable, and it demoralizes the force, making it less capable of rendering efficient service.

"It is contended by the transit company that there was no rule in the schedule of the telephone company against using profane or vulgar language over its lines. Regardless of any published rules, the user of a telephone is bound to conform to the common decencies of civilized society. There is no rule against kicking an instrument or pounding it with a hammer when prompt service is not obtained, but such conduct would certainly justify a withdrawal of the service.

But another question arises: Though the telephone company was entirely within its rights in disconnecting the telephone of the transit company, may not one who thus offends, ever again be entitled to service. It has been a serious inconvenience to the transit company to be thus deprived of service, and doubtless the public, which used the transit company's facilities, has been likewise inconvenienced,

"We think that upon application by the transit company for a restoration of the service, with an assurance that it will be properly used, the telephone company should restore the same, but with the definite understanding that a repetition of the offense will warrant the telephone company in permanently withdrawing its service from the transit company."

Zumbrota (Minn.) Permitted to Collect Higher Rates.

The Zumbrota Telephone Co., which operates a magneto exchange serving about 316 town and 253 rural subscribers in Zumbrota and adjacent rural territory, is authorized by the Minnesota Railroad & Warehouse Commission in an order handed down April 21 to increase its monthly rates as follows:

	Old	New
Individual line business	$2.25	$2.75*
Two-party line business	1.75	2.00*
Extension stations, business	1.25	1.25*
Individual line residence	1.75	1.75*
Four-party line residence	1.25	1.50*
Extension stations residence	.50	.50
Rural multi-party, metallic	1.50	1.75*
Rural multi-party, grounded	1.25	1.50*

*Subject to discount of 25 cents for payment by the 20th of the current month.

Approves Merger of Bell Interests in Five States.

The Southwestern Bell Telephone Co. was authorized by the Missouri Public Service Commission on April 12 to consolidate its interests in Missouri, Kansas, Arkansas, Oklahoma and Texas, and to issue $50,000,000 common stock and $25,000,000 preferred stock to finance the merger.

The application was presented to the commission by E. D. Nims, president of the system for Missouri, Kansas and Arkansas, and J. W. Gleed and Thomas Stokes, attorneys for the system.

The project has been under contemplation for some time and lately approved by the interests concerned.

One of the objects is to bring the system in the five states under one general management, with headquarters in St. Louis, and another and greater object is to float an issue of notes and give the consolidated properties capital for rehabilitating the system and making many extensions.

A capital stock of $200,000,000 is proposed for the consolidated systems.

Troy (Ill.) Telephone Co. Is Granted Rate Increase.

The Troy Telephone Co., which operates a telephone exchange at Troy, furnishing service to 138 patrons in that vicinity, is granted the following increase in its net annual rates in an order issued April 6 by the Illinois Public Utilities Commission:

	Old	New
Individual business	$24.00	$27.00
Individual residence	18.00	21.00
Two-party business	18.00	21.00
Two-party residence	12.00	15.00
Rural party line	12.00	15.00
Extension bells	1.80	1.80
Desk telephones, in addition to regular rate	3.00	3.00

The reproduction cost, new, of the system, including materials and supplies, is estimated by the commission at $14,165, and the reproduction cost, new, less depreciation, $8,539.

The company is ordered to set aside a monthly allowance of $68.50, to provivde a reserve against depreciation, plus 6 per cent of the cost of all annual additions that may be made to the plant in the future.

Rate Increase Allowed—Dividends Ordered Paid Regularly.

The Skeedee Independent Telephone Co. of St. Edwards, Neb., operated in competition with the Nebraska Telephone Co.'s exchange, has been granted an increase in rates by the state railway commission. It serves 475 subscribers, of which a majority are on rural lines, and has more than 160 stockholders. Organized as a rural company, it gradually invaded the town, and since 1909 its rates have been $1 a month.

The company was successful in securing most of the increase asked. After May 1 it is authorized to collect $2 a month for individual metallic, and $1.65 for business grounded service; $1.25 for individual residence, grounded, and $1.10 for party service. On rural lines party connections will cost $1.25 a month. On individual metallic lines, where the subscriber pays for construction from city limits, the regular rate for town service is allowed, but where the company pays the expense of connection, the rates is 25 cents a month for each quarter mile of air-line mileage.

The company is to set aside for main-

tenance and depreciation the sum of $2,500 a year, on a monthly basis, expenditures to be handled in accordance with the uniform system of accounting of the commission. Seven per cent dividends will be allowed on all outstanding stock and all hereafter authorized. Surpluses shall be carried for the benefit of the company.

The exchange is almost entirely of grounded construction, although the company is arranging to make a large part of the town metallic and put in cable. The business metallic rate is not to go into effect until half of the service is metallic.

The company has outstanding $10,600 of stock, and has authority to sell $4,000 additional, as against its present value of $15,186. The company began operations on a very inadequate scale, charging only 30 cents a month when it began business, gradually increasing the rate.

No dividends were earned or paid on past rates, but stockholders have not complained. The company has now grown to a size where more than half the subscribers are renters, and the directors feel they should be allowed to earn at least 7 per cent dividends.

The company's revenue for 1919 were $5,640, and its expenditures close to $5,000. Wages have been increased since then, and the commission's estimate of expenses for 1920 is $7,480. The rates asked for would produce $8,000, and so the commission shaves them a little.

It says that it is its purpose to authorize rates that will earn dividends on stock, and that it is to the interest of efficient financial management that the company pay them regularly. No stockholder should be required to invest funds and secure no return. This has been done in the past, the return being an indirect one in the low charge for service. However, under that plan the non-stockholder benefited equally with the stockholder, although having no investment. This, in the commission's opinion, is inequtable.

Wisconsin Rural Company Permitted to Increase Rates.

The Inter-County Telephone Co., which owns and operates a grounded telephone system in certain sections of Pepin, Buffalo and Dunn counties, was authorized by the Wisconsin Railroad Commission on March 31 to increase its rates for telephone service from $12 to $15 per year per subscriber.

Exchange service is furnished through the switchboard of the Home Telephone Co. at Durand. The company's last annual report shows that 371 subscribers are being furnished service over 32 circuits. All instruments are owned by the company and the company does all the maintenance work and furnishes batteries whenever necessary. The subscribers are classified as 164 stockholders and 207 non-stockholders.

The commission found that the value of the company's property was approximately $10,000. The new rates authorized in this order are applicable as of April 1, 1920, and may be collected in advance in semi-annual installments.

Wisconsin Rural Companies Are Granted Higher Rates.

The Wisconsin Railroad Commission, in orders handed down April 19, granted increases to the Denmark Farmers & Merchants Telephone Co., of Denmark, the County Line Telephone Co., of Tisch Mills, the Black Earth Telephone Co., of Black Earth, and the Leeds Farmers Telephone Co.

Farmers & Merchants Telephone Co. is given permission to increase its rates from $6 to $9 per year per subscriber. The company operates and owns a metallic telephone system in the village of Denmark, Brown county, and in the rural territory tributary thereto, serving approximately 315 subscribers over 29 circuits. All of these subscribers, with the exception of 15, are also stockholders in the company.

The County Line Telephone Co., which owns and operates a telephone system in the village of Tisch Mills, Manitowoc county, and affords service to subscribers in the village and the rural territory in the northern part of Manitowoc county and southern part of Kewaunee county, is authorized to increase its rates for service from $4 to $7 per year.

The switchboard of the company is of the magneto type, and all the circuits are full metallic. The 150 subscribers, which are being served over 10 circuits, are all stockholders, and it appears that most of the repair and maintenance work is done upon a co-operative basis. The balance sheet of the company as of December 31, 1919, shows a property and plant account of $6,832.98.

The Black Earth Telephone Co. is authorized to increase its rates for service from $12 per telephone per year to $16 per year for individual line service, and $15 per year for party line service. The company has one exchange in the village of Black Earth, and serves 310 subscribers, 213 of whom are rural residence subscribers.

The switchboard is of the magneto type, with a capacity of 300 lines. All of the subscribers' lines are of the grounded type. Free trunks connect the company's exchange with Mount Horeb, Mazomanie and Arena. A line having 10 stations of the Farmers Union Telephone Co. is also brought into the exchange. Toll connection is made with the Wisconsin Telephone Co. The book value of the company is carried at $7,595.

The Leeds Farmers Telephone Co. is permitted to increase its rates from $12 to $13.60 per telephone per annum, payable in advance, and subject to the usual 25 cents per month discount for prompt payment. The commission refused to make any modification in the present division of toll charges of the company.

Stock Issue Allowed — Depreciation Reserve Ordered Set Up.

The Wisconsin Railroad Commission rendered an opinion in the matter of the application of the Commonwealth Telephone Co., of Madison, for authority to issue $35,000 of stock, and $50,000 of bonds on April 17. The company asked authority to issue these securities for the purpose of exchanging them for the physical properties of the New Union Telephone Co. and the Richland Telephone Co., of Richland Center.

Tentative valuation made by the commission's engineers for the purposes of these proceedings, together with other evidence, indicated a value for securities purposes of approximately $85,000 for the properties combined, without taking into account the depreciation reserves, which are not to be taken over in the consolidation. The commission required, however, that a reasonable depreciation reserve of at least $20,000 should be set up in the reorganized companies, and granted authority to issue the securities previously mentioned with the understanding that the issue of securities by the new company will result in the opening of its books with a balance sheet in substantially the following form:

Assets.

Property and plant	$101,300
Materials and supplies	3,700
Total	$105,000

Liabilities.

Bonds	$50,000
Stock	35,000
Depreciation reserve	20,000
Total	$105,000

Summary of Commission Rulings and Schedule of Hearings.

ARKANSAS.

April 14: The commission ruled that it is unlawful for the Hotel Marion, Little Rock, to charge 10 cents for room telephone calls destined to points within the city, as that amount is in excess of the rate on file with the commission by the Southwestern Bell Telephone Co.

DISTRICT OF COLUMBIA.

April 17: Petition filed by the Chesapeake & Potomac Telephone Co. for an increase in rates.

INDIANA.

April: The commission granted an increase in rates to the Greenfield Telephone Co., of Greenfield, and ordered the company to discontinue the practice of furnishing service free or at reduced rates to the city, city employes and others.

April 12 The commission granted an

increase in rates to the Citizens Telephone Co., of Decatur and Berne.

April 23: The Citizens Independent Telephone Co., of Terre Haute, is given permission to take over the local properties of the Central Union Telephone Co. and a new rate schedule is approved for the unified system.

April 27: Hearing at Indianapolis in re application of the Dunlaps Mutual Telephone Union of Elkhart county for an increase in rates.

MICHIGAN.

April 27: Hearing at Lansing in re application of the Michigan State Telephone Co. to increase rates for telephone service in the city of Detroit, adjourned from April 23.

MINNESOTA.

April 21: The commission granted an increase in rates to the Zumbrota Telephone Co., operating in Zumbrota and vicinity.

May 3: Hearing at St. Clair in re application of the St. Clair Telephone Co. to increase local and rural rates in that village and vicinity.

May 6: Hearing at Gary in re application of the Gary Telephone Co. to increase business and residence rates in that village.

May 7: Hearing at Audubon in re application of the Audubon Telephone Co. to increase local and rural rates in that village and vicinity.

May 10: Hearing at Springfield in re application of the Farmers & Citizens Mutual Telephone Co. to increase local and rural rates in that village and vicinity.

May 12: Hearing at Finlayson in re application of the North Star Telephone Co. for an increase in local and rural rates in Finlayson and McGrath.

May 14: Hearing at Wood Lake in re application of the Wood Lake Telephone Co. for an increase in local and rural rates in that village and vicinity.

May 18-19: Hearings in re application of the Blue Earth Valley Telephone Co. to increase rates at its various exchanges are scheduled as follows: May 18, at Blue Earth, for hearing on Blue Earth, Elmore, and Guckeen exchanges; May 18, at Winnebago, for hearing on Winnebago and Huntley exchanges; May 19, at Wells, for hearing on the Wells exchange.

May 20: Hearing at Barnesville in re application of the city of Barnesville, a municipal corporation, for authority to increase its rates for business and residence service within the city.

May 21: Hearing at Grey Eagle in re application of the Grey Eagle Rural Telephone Co. for authority to increase its local rates in that village.

May 27: Hearing at Baudette in re petition for the physical connection of the lines of the People's Co-operative Telephone Co. with the exchange of the Warroad Telephone Co. at Baudette, and prescribing reasonable terms therefor.

MISSOURI.

April 15: The commission approved the sale of the telephone plant, exchange and property of the Hume Telephone Co. described belonging to the estate of Ell Miller, deceased, together with all franchise rights and contracts for the operation of the telephone plant and property by Chas. Coleman, administrator, to Mrs. Ella B. Jeffries, co-applicant, in this proceeding. No. 2291.

April 19: The commission suspended until October 29, 1920, the proposed rate schedules of the DeKalb County Telephone Co. for service in Maysville, Fairport, Amity, Osborn, Santa Rosa, Weatherby, Woods and Clarksdale, and the Hanamo Telephone Co. for service in Maryville. Nos. 2291 and 2302.

April 21: The commision approved the consolidation of the Bell interests in Missouri, Kansas, Arkansas, Oklahoma and Texas by the Southwestern Bell Telephone Co. and authorized the issuance of $50,000,000 common stock and $25,000,0000 preferred stock to finance the merger.

NEBRASKA.

April 20: Application filed by Hickman Telephone Co. for an increase in rates, alleging that present costs have made existing schedule insufficient to properly care for property.

April 20: Application filed by the Plainview Telephone Co. asking for an increase in exchange rates.

April 21: Application filed by the North Salem Telephone Co., of Dakota City, asking for validation of rates mistakenly put into effect without securing permission from the commission.

April 21: Application filed by the Comstock Telephone Co. alleging insufficiency of present rate schedule and asking for permission to publish increased rates.

April 21: Complaint filed by Bert Overturf, of Sutton, alleging that the Lincoln Telephone & Telegraph Co. has failed for 30 days to furnish service.

April 22: Complaint filed by L. E. Marti, of Rising City, alleging that the Surprise Telephone Co. is not giving efficient or proper service.

April 22: In re application of the Barneston Mutual Telephone Co. for permission to issue additional stock, commission holds that application is reasonable and orders that company be permitted to issue $3,000 additional stock, to be sold at par and for cash at $35 a share. The company requires each new renter to take a share of stock, and the additional issue is to be used in caring for applications for service.

April 24: The commission granted an increase in local and rural rates to the Skeedee Independent Telephone Co., of St. Edwards.

May 14: Hearing of the matter of the finances of the Stanton Telephone Co., undertaken on commission motion to ascertain from what source unusual dividends have been paid.

NEW JERSEY.

April 17: The commission sustained as reasonable a regulation of the New York Telephone Co. prohibiting the use of any equipment other than that furnished by the company.

NEW YORK.

April 23: The board of trustees of Sodus, N. Y., asked permission to withdraw the complaint filed recently with the commission against the Wayne Telephone Co. over advanced rates for telephone service. This action was authorized at a meeting of the Sodus trustees.

OHIO.

April 14: Hearing at Columbus in re petition of the Citizens Telephone Co., of Delaware, to increase rates.

April 17: The commission gave an order in the case of the city of Lima, et al. vs. the Lima Telephone & Telegraph Co. again modifying its order of March 9, 1917, as amended June 12, 1919, fixing the following rates for business and residence service: Individual line business, $68 net per year; two party business, $54; individual line residence, $30; two-party, $24; four-party, $21. The rate schedule previously allowed, insofar as it exceeds the rates quoted, is found by the commission to be excessive, unjust and unreasonable. No. 443.

PENNSYLVANIA.

April 13: The Sabula Telephone Co., of Sabula, filed a new schedule of rates effective May 10.

April 14: Notices of increases in rates filed by the Plain Grove Telephone Co., Lawrence county; Saxonburg Telephone Co., Midway Mutual Telephone Co., the Rural Telephone Co., operating in Edenburg, Clarion county, and the Campbelltown Rural Telephone Co.

May 5: Hearing of complaints against the increases in rates announced by the Bell Telephone Co., of Pennsylvania.

WISCONSIN.

April 17: The commission granted permission to the Commonwealth Telephone Co., of Madison, to issue $35,000 of stock and $50,000 of bonds for the purpose of exchanging them for the physical properties of the New Union Telephone Co. and the Richland Telephone Co., upon certain conditions.

April 19: The commission granted increases in rates to the Denmark Farmers & Merchants Telephone Co., of Denmark, the County Line Telephone Co., of Tisch Mills, the Black Earth Telephone Co., of Black Earth, and the Leeds Farmers Telephone Co.

April 23: Permission is granted the Arena & Ridgeway Telephone Co. to increase its rates for telephone service at Arena and Hyde and vicinities.

April 23: The commission found that public convenience and necessity did not require the extension of the Reedsburg Telephone Co. in the town of Ableman, Sauk county, as proposed in its notice filed with the commission. The proposed extension would be about the length of two city blocks, in the unincorporated vilage of Ableman, where both the Reedsburg company and the Wisconsin Telephone Co. have subscribers. The Wisconsin Telephone Co. objected to this proposed extension on the ground that this territory is logically tributary to its exchange at North Freedom. The Reedsburg telephone exchange is about 7 miles from Ableman and the Wisconsin company exchange at North Freedom is about 4 miles distant.

April 23: Upon the informal complaint made to the commission by S. E. Brown to the effect that, in connection with the extension of telephone service to his premises, he was compelled to purchase two shares of stock of the Pulaski Merchants & Farmers Telephone Co. at $65 per share in order to secure such service, the commission held a hearing on April 13, 1920. The testimony brought out the fact that the company is serving numerous subscribers who do not own any shares of stock in the company, and that the refusal to serve other applicants for service who do not wish to become stockholders would therefore result in discrimination. The commission has now ordered that the Pulaski Merchants & Farmers Telephone Co. cease and desist from the practice of requiring prospective subscribers to purchase stock of the company as a condition precedent to receiving service.

April 26: Hearing at Madison in re application of the Bonduel Telephone Co. for authority to increase rates.

April 26: Hearing at Madison in re application of the Comet Telephone Co. for authority to increase rates.

April 27: Hearing at Madison in re application of the West Wisconsin Telephone Co., of Glenwood City, for authority to increase rates.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

1321. Why should some means be provided in connection with the call distributing equipment of the general type shown in Fig. 305, to indicate when the traffic is not being dispatched as rapidly as it is being received?

1322. How is this taken care of in one system? What is the theory involved? In the type of equipment illustrated in Fig. 305, what indication is given of the condition when the number of trunks and operators' positions are insufficient for the peak traffic?

1323. Why is it important in any system of this character, that instant notification be given when calls are being received in greater numbers than can be readily and promptly handled? What necessity is obviated by the installation of an overflow indicator?

CHAPTER XXXIII. Operating Combinations Including Switching (Continued).

1324. *Call distributor, using line switch.*—In Fig. 306 is shown one circuit arrangement possible when the conventional type if line switch is used in connection with cords and plugs for manual call distributing equipment. This circuit is adaptable, for instance, to a trunk-grouping arrangement as in Fig. 304.

The operation of the line switch is precisely the same as the operation of the line switch when used with full mechanical switching equipment. The progress of a call with call distributing equipment involves no mechanical switching, however, except that involved in the selection of the trunk circuit by the line switch associated with the line on which the call originates.

1325. *Energization of the line-switch plunger.*—When the subscriber, using an ordinary plain common battery telephone, removes his receiver from its hook, a path is completed for a flow of current which may be traced as follows:

Starting at the positive or grounded terminal of the common battery, the current flows through the normally closed make-and-break contact, 5, of the bridge cut-off relay, *B*, over one conductor of the line circuit to the telephone instrument, through the normally open telephone switch hook contact (now closed), the telephone instrument and the other conductor of the line circuit, the normally closed make-and-break contact, 6, of the bridge cut-off relay, *B*, the energizing winding of the line relay, *C*, the open main bus bar, 12, the normally closed contact, *H*, of the line-switch master-switch release magnet, *F*, and the common battery.

As a result of this current flow in its operating winding, line relay *C* is energized and operated, and by its normally open contact 7 (now closed) completes an obvious path for a flow of current through the pull-down coil, *A*. This flow of current energizes the pull-down coil, and operates the line-switch plunger, forcing it into the bank contacts before which it is poised at the moment. The normally open line-switch bank contacts, 8, 9, 10, and 11, are closed.

1326. *Current flow through windings of double-wound relay.*—Through the normally open line-switch bank contacts, 8 and 11, the two sides of the calling telephone circuit are extended to the terminals of the trunk condensers, 2 and 3. This completes a path for a flow of current through the two windings of the double-wound relay, 18, which is traceable as follows:

Starting at the positive of grounded terminal of the common battery, the current flows through one winding of the double-wound relay, 18, the normally open line-switch bank contact, 11, (now closed) one conductor of the telephone line circuit to the calling telephone, the normally open telephone hook switch (now closed), the telephone instrument, the other conductor of the telephone line circuit to the calling telephone, the normally open line-switch bank contact, 8 (now closed), the second winding of the double-wound relay, 18, and the common battery.

1327. *Energizing of bridge cut-off relay.*—As a result of this flow of current, double wound relay 18 is energized and operated. Its armature closes the normally open make and the normally open make-and-break contacts connecting the positive or grounded terminal of the common battery to the winding of bridge cut-off relay and completing a path for the flow of current through it which is traceable as follows:

Starting at the positive or grounded terminal of the common battery, the current flows through the normally open make contact of double-wound relay 18 (now closed), the normally open line-switch bank contact, 9 (now closed), the winding of the bridge cut-off relay, *B*, the open main bus bar, 12, the normally closed contact, *H*, of the line-switch master-switch release magnet, *F*, and the common battery.

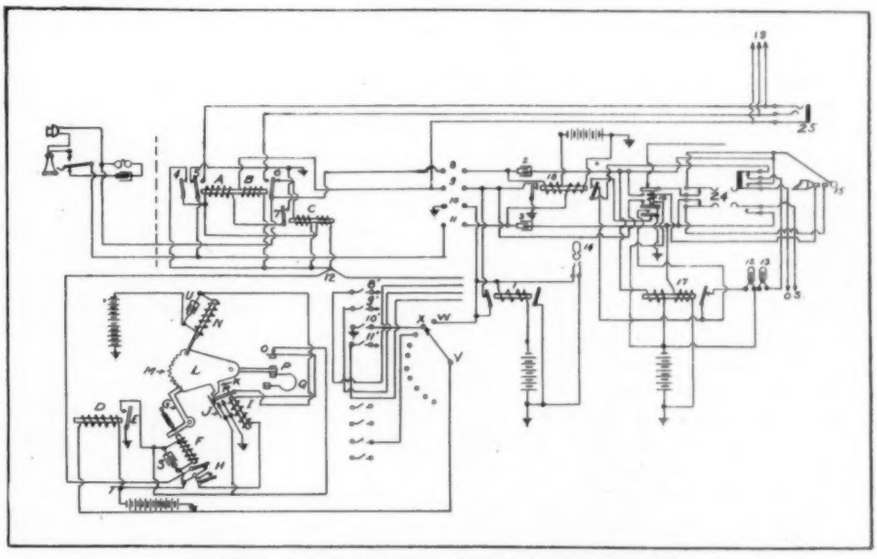


Fig. 306. Call Distributing Circuit for Line Switch.

The resulting operation of the bridge cut-off relay *B* at once interrupts the flow of current through the operating winding of the line relay, *C*, and the calling telephone line circuit and instrument by opening the normally closed contacts, 5 and 6.

It should be noted for future reference that the operation of bridge cut-off relay *B* will also connect the two sides of its associated telephone line circuit to the tip and ring contacts of the multiple jacks, one of which is represented at 25.

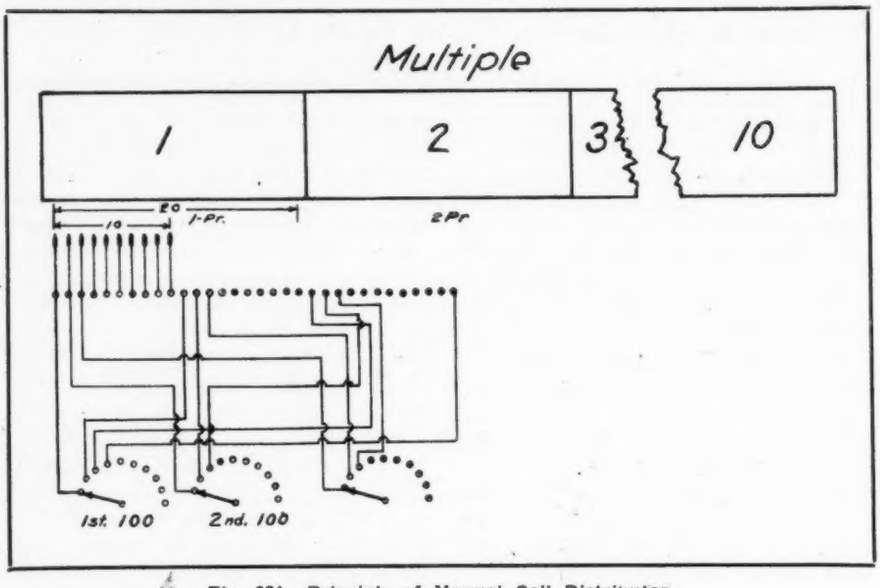


Fig. 304. Principle of Manual Call Distributor.

1328. *Effect of operation of line-switch plunger.*—When double-wound relay 18 is operated as a direct result of the operation of the line-switch plunger, not only is the positive or grounded terminal of the common battery connected to the terminal of bridge cut-off relay *B*, but it is also connected to the sleeve of the associated multiple jack. This is for the purpose of providing the necessary busy test, so that an intruding call, on another trunk, may be barred as long as the line circuit is engaged with the originating call.

It will be remembered that when the line-switch plunger is fully operated, the auxiliary normally open contact 4 is closed. This contact places a low resistance shunt around the holding winding of the line relay, *C*, so that its armature will be at once released when the flow of current through its operating winding and the normally closed make-and-break contacts, 5 and 6, of bridge cut-off relay is interrupted.

When the line-switch plunger is operated, the normally open line-switch bank contact, 10, is closed. This completes a path for a flow of current through the master-switch bank contact and wiper and the winding of the line-switch master-switch release relay, *D*. As a result, *D* is energized and operated, and the plungers of all the line-switches in the same mechanical group are moved forward and poised over the next available set of line-switch bank contacts.

For a thorough review of the operation of this type of line-switch master-switch, read sections 1133-1140, inclusive, TELEPHONY's Home Study Course for Telephone Men, issues of January 4, 11, and 18, 1919. The operation of the line-switch and the line-switch master-switch in the circuit shown in Fig. 306 is precisely the same as the operation of the same equipment when used with full mechanical switching.

1329. *The make busy key.*—The key shown at 14, Fig. 306, completes exactly the same circuit to the line-switch master-switch bank contacts as the normally open line-switch bank contact, 10. It is known as the "make busy key," and is used by the operator at the position when she is relieved from duty and no one else is assigned to her position.

A very little reflection will show that the effect of the continued operation of this key will be to keep the line-switch master-switch bank contact for the trunk circuit in which the key is connected, busy. In other words, since this trunk will be represented in the bank of the line-switch master-switch by a grounded bank contact, no calls will be delivered to it. Were it otherwise, it would be possible for an operator to leave one of the switchboard positions while calls were being delivered there, and such calls, having been delivered to their selected trunk circuits, would fail to receive service.

When double-wound relay 18 is operated, it completes a path for the flow of current through the trunk signal lamp, 13, which is traceable as follows:

Starting at the positive or grounded terminal of the common battery, the current flows through the normally closed make-and-break contact of relay 16, the normally open make-and-break contact of double-wound relay 18 (now closed), the normally closed contact of key 24, the lamp, 13, and the common battery. This flow of current causes this lamp to glow, indicating to the operator on duty that a call has been delivered to this trunk on her position. *(To be continued.)*

Reveals Under-Sea Telephony Possible and Practicable.

An important development which may revolutionize the present system of world cable communication was announced April 27 before the National Academy of Sciences by Maj. Gen. George O. Squier, chief signal officer, United States army.

Maj. Gen. Squier stated that bare wires, laid in the sea to replace the submarine cables, may be used for the transmission of messages, both by telephone and telegraph. The use of the bare wire is said to open the way for telephone conversations between the United States and Europe or even China.

Explaining how the army had obtained wellnigh perfect results, both in telegraphing and telephoning over bare wires, laid in the water and on and under the ground, Gen. Squier predicted that the expensive heavy-insulated land and submarine cables now in use would be replaced by single bare wires, over which a number of telephone and telegraph messages would be sent at the same time.

Gen. Squier said that both telegraph and telephone communication were established recently between Fort Washington, Md., and Fort Hunt, Va., distant three-quarters of a mile on opposite sides of the Potomac river, by the use of a bare phosphor-bronze wire laid in the river to connect the two stations.

Similar communication was established between two stations at the signal corps laboratory at Camp Alfred Vail, N. J., by using bare copper wire buried about eight inches in the earth and connecting the two stations, about three-quarters of a mile apart.

As ocean telegraphy in its present form has reached a limit and submarine telephony is practically impossible, Gen. Squier said, the hope for improvement lies in the adoption of bare wires laid in the water, using high frequency currents and in the study of the necessary changes.

While the germ of the present idea was noted by Gen. Squier in 1910, it was not until the United States entered the war that the necessity for rapid development came. He said that the need of eliminating insulation arose when the United States was called on to supply the allies as well as itself. Machinery for insulating wire in use in this country had a capacity of only 8,000 miles a month, whereas 40,000 miles of wire monthly was required by the American army alone.

Sundry Snapshots Along the Trail

Observations and Comments, Pertinent and Otherwise, On the Sunshine and Shadows of Telephone Work

By Well Clay

How old do you think the world can be—
A million years and a day?—
Since the land first rose from the restless sea,
There's no one that can truly say.

How long do you think the world will stand?
May be asked by those who will;
'Ere the sea again will gulf the land
And the planet be cold and still?

The earth looks old to men of age,
And the winters seem dark and cold,
The wind seems rough to the white-haired sage
And Nature his bones doth scold.

But the sun shines bright to the youthful eye,
And the earth is young and fair,
The soft winds caress, as they drift by,
Loose locks from his shining hair.

To the aged, the earth is old and gray,
As Nature looks old in the fall,
To youth, Dame Nature is young and gay;
It's a matter of years, that's all.

A man recently remarked to me, in speaking of the settlement of some of the various questions which are coming up before state commissions: "It will probably be a matter of years before a majority of them are disposed of, and, by that time most of us will be no longer interested in the decisions."

If this is true, and who doubts it, the business as a whole will be bound to suffer. The question for instance, of what should be taken into consideration in rate-making cases is now under consideration. As has been amply mentioned in TELEPHONY in recent issues, the physical value alone should not be taken as the only factor but the ability to deliver the goods should be a part and a good part.

The big showy automobiles commands a big price, but the jitney does most of the work when it comes to practical operations. The size of a body does not determine its value, but the law has so designated in delegating authority to the commissions to regulate telephone matters. Suppose a man, in getting married, should first determine the weight of the bride-to-be before committing himself to the venture, instead of observing whether or not she is a good housekeeper, perhaps.

A woman of weight might be an inert mass for all practical ability when it came to building a home, and, on the other hand, a woman of less than a hundred pounds in weight, might be a bundle of cyclonic activity translating herself in terms of efficiency. Same way with a telephone plant.

It is safe to say that today the average small telephone plant with all its violation of standards in the matter of materials and construction, is rendering better satisfaction than many larger companies. It is in a position to do so, because its operatives are closer in touch with the patrons, both in sympathy and interests, than are the operatives of the big metropolitan exchanges. It sometimes happens too, that the ruralite going to the city and expecting to be answered back in a flash, when he takes down the receiver of a telephone, is soon disillusioned.

The question of reproducing the plant is, of course, a vital one and a matter to give concern to all people holding telephone securities because it will cost from three to four times the cost of the old plant to reproduce it as it stands today. Perhaps no plant will ever be reproduced as it now stands on account of difference in construction and operating methods, and it will be a fortunate thing if it will not be necessary.

In the matter of poles alone, the increase in price will preclude the building of new lines to replace the old of the same materials, because there are not the materials, in the first place, and the present-day prices, even taking into consideration the most advanced rate already allowed by commissions will not provide the necessary revenues nor anywhere near it.

What then is the commission to do when a line is beyond the repairing stage and revenues from patrons along that line are not paying a rate that returns a reasonable return, as the line now stands? Can a commission consistently order a telephone plant to do a thing which all parties agree is to lose them money?

Even the patron, sometimes found, who is willing to pay a larger rate does not seem to be taken into consideration.

What would happen in these days when farm land is jumping from fifty and a hundred to two or three hundred dollars an acre if we were to appoint a commission to see that they did not raise prices to a point which would yield them a return on cultivating the high-priced land.

Suppose the commissioners should base their contention on the fact that, taking an average price of farm land in general, prices did return a profit on the investment of farm land and not considering the productivity of certain farms over others or their location, or richness in certain elements favorable for the raising of certain highly-specialized products. Yet it seems to me that this is exactly what the average commissioner is trying to do today.

The manager of a telephone company said to me this week: "I am going to ask for a rate increase for all of the five exchanges which I operate, but I am discouraged over the present outlook, for it seems to me that the present tendency of commissions is to prescribe those rates and conditions that will only return a profit for companies operating under the most favorable conditions, and conditions now are the very reverse of favorable, as far as we are concerned."

The fact that the patron is willing to share a portion of the increase in price, comparable with the rise in other commodities, does not influence matters in the least, apparently. It is my opinion that every rural telephone in the United States today that is being operated for less than $24 per year is losing money. The ability of the customer to pay is not recognized in rate making, but in many lines of business we all know that such a factor is not lost sight of by any means.

We have one patron operating a stock farm in a rural community adjacent to this exchange, who has made more money off a Holstein bull in three years than this company will make in operating a telephone exchange of over a thousand telephones in five years. He bought the said animal a couple of years ago and paid a few thousand dollars for it; I think five, a mere trifle, anyhow. Last week it was sold at auction for $33,000 after returning an enormous profit to the owner for three years. That was just one animal and this patron has a farm well stocked with many cattle and other things necessary to people.

It surely would be a shame and a crime for a commission to make this poor unfortunate man pay two dollars a month for his telephone service, even if he does use it principally for business and is willing to pay what is right. I used to think that a man in the telephone business was pretty well off in the matter of income over outlay, but present-day conditions have changed matters a good deal.

APHORISM: The old man of the sea overplayed his hand.

Practical Hints—What's Your Pet One?

Changed Numbers on Party Lines.

By R. O. Parks.

Quite frequently it is necessary to change a party line subscriber's number on account of regrouping stations or of subscribers moving to other locations.

When vacancies occur in this manner and other parties are assigned these vacancies before the issue of the next directory, difficulty arises immediately. For example: Mr. Brown moves; his old number was 620-W, his new number is 840. Mr. Jones takes the station vacancy and the number left by Mr. Brown. Unless Mr. Brown's old multiple, 620-W, is marked to refer to changed number or information operator, Mr. Jones receives Mr. Brown's calls. If 620-W is marked, all of Mr. Jones' calls go to changed number or to the information operator, which is a waste of time in repetition and an irritation to the calling parties.

This annoyance causes considerable complaint, and unless attention is paid to it, serious trouble and even a loss of subscribers may be the result.

There are two common practices: One is to not reuse a station which has been vacated until a new directory is published. This method is satisfactory from a traffic standpoint but not from a plant, for often it is necessary to string a lot of new wires in order to work it out.

The other practice is to use the stations regardless of the traffic difficulties that may arise.

The plan described herein has been worked out satisfactorily in several exchanges under the writer's supervision. It can best be applied to exchanges equipped with an intermediate distributing frame (I. D. F.) though it can be applied to an advantage in other cases.

Taking the foregoing example: Instead of assigning Mr. Jones Mr. Brown's old number, he is assigned a *temporary number;* for example, 762-W, or any vacant number which has not been in use since the last directory. This temporary number, 762-W, is cross-connected on the I. D. F. to Mr. Brown's old number, 620.

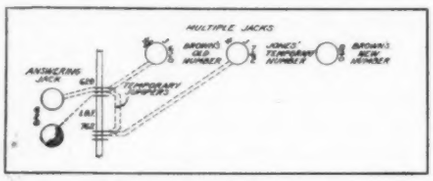
Both temporary and permanent numbers are written on the work orders as "Mr. Jones; 620-W—temporary number, 762-W." These orders are kept as records of temporary cross-connections so that at the time of the next directory they may be readily removed.

To avoid confusion the subscriber is notified that he will have a temporary number.

Anyone wishing to call Mr. Jones' telephone would be referred to the information operator as his number would not be in the directory. In answer to all such calls, the information operator will says: "Mr. Jones' temporary number is 762-W."

All calls for Mr. Brown, on his old number, 620-W, which is marked, will be referred to the changed number or to the information operator, who will give out the new number, 840.

At the time of the issue of the next directory, the temporary cross-connection on the I. D. F. is taken off, the work order filed, and the temporary number



Connections Used in Scheme for Changed Party Line Numbers.

marked or plugged. The multiple is marked, in case the parties continue to call the temporary number. In such cases, parties calling will be advised that Mr. Jones' number is changed to 620-W.

Proper Inspection and Cleaning of Switchboard Keys.

Care should be taken at all times by telephone repair and maintenance and repairmen to see that the switchboard keys are kept in perfect condition by periodic inspection and observance to the following precautions:

Keep all the working parts of the keys, as well as the clearing-out signals, free from dust and dirt. It is especially essential that the spaces between the key contact springs should be kept thoroughly clean; otherwise there is a danger of current arcing at these points which will break down the insulation, causing "burnouts" and failure in the proper operation of the keys. Don't allow dust and dirt to accumulate on these parts.

The moving parts of the keys and signals are so designed as to require no lubrication. These parts should never be oiled. Their failure to operate properly is generally due to an accumulation of dirt or some other foreign substance which when cleaned will quickly clear up the trouble.

At times the contacts in the key springs —also in the clearing-out signal night alarm springs—may become dirty or subject to a coating over the surfaces of the contacts, which may act as an insulator and prevent the closing of an electrical circuit connection.

Keep the contacts clean, but do not use a file. A contact that is cleaned by filing away some of the surface metal is never satisfactory, as it usually leaves the contact rough and, therefore, makes an ideal condition for the collection and retention of dust or other foreign substance, which prevents the proper operation of the contacts.

The best method to clean contacts is to use a strip of plain, smooth cardboard (a visiting card will do). To clean a pair of contacts slip the card between the contacts when they are in a closed position. In cleaning the night alarm contacts it is necessary to hold down the armature so as to close the contacts and then draw the cardboard through. This is the safest way to clean contacts in electrical apparatus and should always be followed.

Device for Ascertaining Depth of Water in Hold of Ship.

One of the attractions at the big shipping exhibition at Olympia, London, is an automobile float telephonically controlled, the invention of a recently demobilized army engineer. The instrument is designed to give warning of water depths and could be used to good effect in engine rooms or the holds of ocean-going vessels.

The device is placed on the surface of the water, there being a wire connection with another delicate instrument on the bottom. When the engineer wishes to know the depth of water present he rings up "Katie," as she is termed, on the telephone who at once informs him the exact depth in soft jerky buzzes somewhat after the manner of the Morse code. If the water is over a certain depth "Katie" begins to stutter, and if the current is too strong, she becomes speechless.

The instrument is designed for special use where, say, a collision has occurred at sea. The captain of the ship can at once find out how much water is in the hold or the engine room with the aid of "Katie."

Telephones to Connect Groups at Republican Convention.

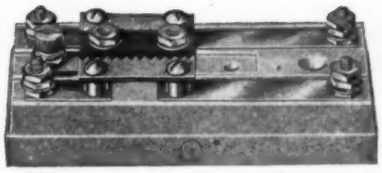
Delegates at the Republican National Convention, opening in Chicago, June 8, will be able to confer with each other without leaving their seats. To eliminate the confusion incident to conferences between delegates on the floor, C. R. Hall, superintendent of the Coliseum, has arranged for the installation of telephones connecting all state, district and territorial delegations.

It is said this will be the first time such a system has been installed at any national convention. There will be 53 telephones in service, reaching the 48 state groups and the representatives of the District of Columbia, Alaska, Hawaii, the Philippines, and Porto Rico.

The convention architects have com-

Uninterrupted Use of Farm Telephones

**No. 975B—
Self-Cleaning
Sawtooth Airgap
Lightning Arrester**



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Recognized
Standard for
Rural Protection**

No Dirty Carbons to Clean

A. W. FORBES

STANTON, NEBR.

November 4, 1919.

Reliable Electric Co.,
Chicago, Ill.

Gentlemen:-

Please send us sample blocks as per your advt. in Nov. 1st Telephony - Blocks to fit the Western Electric 60A protector also switchboard and cable cans protectors. We have used your #975B protectors on our farm lines for about three years and in no instance have we had a case of trouble through the failure of your protector. We have over 250 in use and I would not change back to our former protectors for $10.00 per station.

Respt. yours,
STANTON INDEPENDENT TELEPHONE CO.
A W Forbes PREST.

Many Reports in our Files show that these Protectors are actually Self-Cleaning

Never Grounds the Line

A. W. FORBES

STANTON, NEBR.

November 8, 1919.

Reliable Electric Co.,
Chicago, Ill.

Gentlemen:-

Replying to your favor of 11/6 will say you may use the letter anyway you wish if it will be of benefit to you - I feel so grateful to the salesman who showed me the sample at Lincoln, Neb. some four years ago that I would like to meet him and buy him a good "feed" as the use of the 975B protector has saved us untold trouble and much expense.

The catalog and samples have not come to hand yet but will soon. I will find the type of arresters needed in our rack and in cans and ask for samples.

Respt. yours,
STANTON INDEPENDENT TELEPHONE CO.
A W Forbes PREST.

Permanent Relief from Protector Trouble on Farm Lines

Protect your Telephone Service as well as your employees and property.

Reliable Electric Company

411 South Sangamon St., Chicago, Ill.

pleted plans for the Coliseum, including an extra balcony that adds approximately 1,100 to the seating capacity. Work on the balcony and the convention offices, in the Coliseum annex, will start May 3. The Chicago Convention Committee is spending $47,000 on changes to the building to accommodate the delegates and more than 10,000 spectators.

Lima Company Has Big Construction Program Under Way.

The construction of a three-story extension to its present exchange building located at 122 South Elizabeth street, Lima, Ohio, is now under way by the Lima Telephone & Telegraph Co., of which Geo. H. Metheany is secretary and general manager. The accompanying illustration shows the building as it will appear after the extension is completed.

The addition to the company's facilities is made necessary by the rapid growth in its subscriber list and immediately upon the completion of the extension, additional automanual switchboard apparatus will be installed.

At the present time the Lima exchange is serving some 10,800 subscribers. The 1920 census shows a population of 41,306 indicating a saturation of one telephone to 3.8 inhabitants.

The extension which is being added will be 27 ft. wide and 75 ft. long and will provide additional space for the commercial department on the first floor, the operating department on the second floor and the switchroom on the third floor. The additions and alterations to the present building will cost $75,000.

A large amount of aerial and underground cable purchased in 1919 will be installed this year and the company's program of extension and improvements will require the expenditure of approximately $130,000 during 1920.

No Successor to Vail as Chairman —Provisions of His Will.

Announcement was made at the offices of the American Telephone & Telegraph Co. that at a recent meeting in Boston last week, the directors had adopted resolutions expressing their indebtedness to the late Theo. N. Vail for his guidance. The office of chairman of the board, held by Mr. Vail, was abolished.

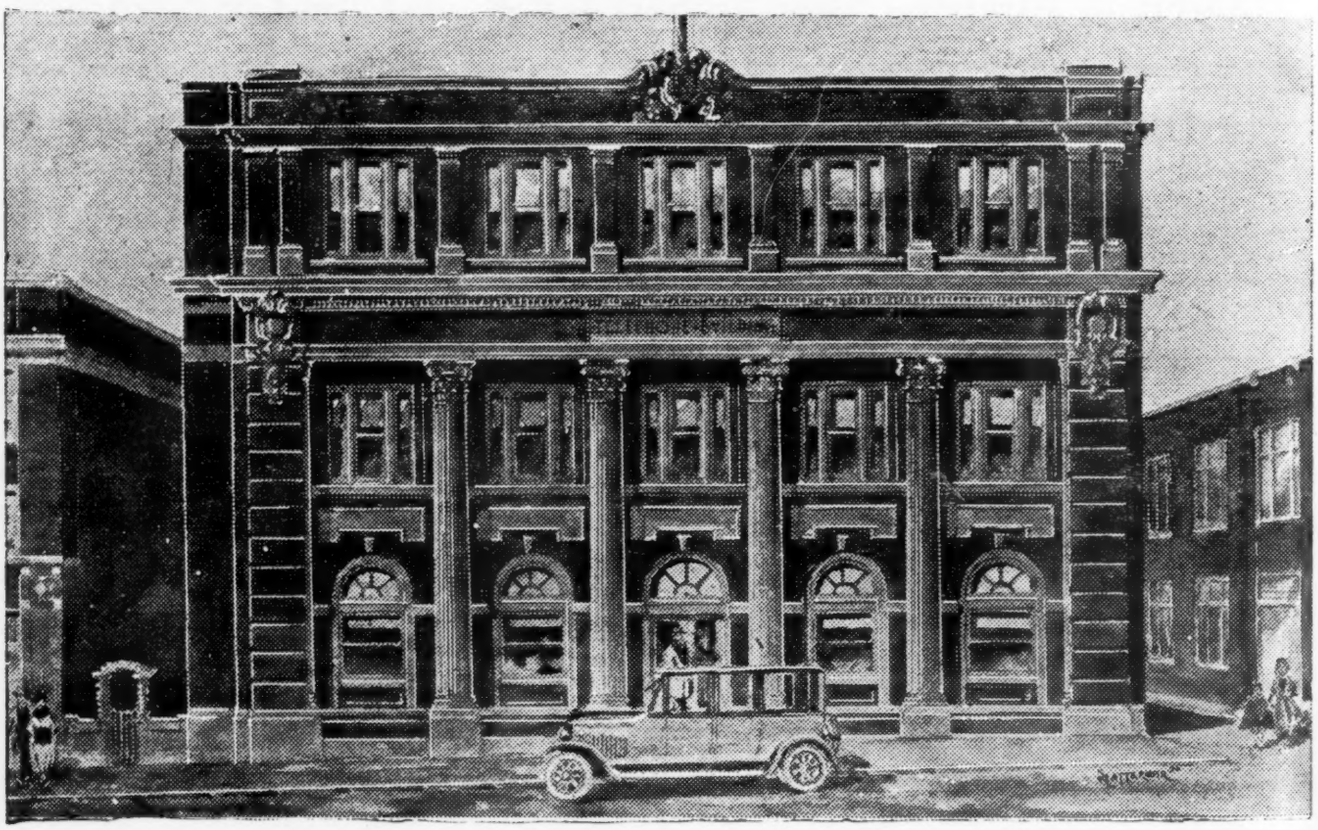
Morristown, N. J., the Lyndon (Vt.) Literary and Biblical Society and several colleges will benefit by the will of Mr. Vail, made about six months before his death in Baltimore on April 16. This announcement was made by Mr. Vail's lawyers, with the statement that an estate of "very moderate value" is indicated.

After providing for the widow, Mr. Vail's niece and adopted daughter, Mrs. Caroline Vail Marsters; several other relatives and faithful servants, the will sets forth that a house recently built in Morristown by the late telephone pioneer, as well as property known as the Vail homestead, shall be known as the Vail House and occupied by "some appropriate society which shall maintain the history and traditions of Morris county in particular and New Jersey in general."

This society, according to the will, shall maintain "a course of lectures, musicales and other functions of amusement and education free to the public."

Besides bequests to the Presbyterian Church of Parsippany, N. J., where funeral services for Mr. Vail were held, the will leaves all his real estate in the county of Caledonia, Vermont, including the famous Speedwell farms, to the Lyndon Literary and Biblical Association.

Bequests are made to Harvard University, the Massachusetts Institute of Technology, Dartmouth College, Princeton University, Middlebury College and Phillips Exeter Academy.



New Building of the Lima Telephone & Telegraph Co. Now Under Construction.

Keyboard Pocket Not a Storage Place for Operator's Use.

Telephone operators frequently make the keyboard pocket under the key shelf a favorite receptacle for their pocketbooks, papers, magazines, pencils, gum, etc. This is a bad practice and should not be permitted because of the danger of injury to the working parts of the keys, clearing-out signals or wiring.

It is best to remove the key from the lock so that the key pocket can be made to serve as a protection to the apparatus and not for a storage place.

INSURANCE

at a Saving of fully 20%

Insurance at Cost

Under the plan employed by Lynton T. Block & Company, you are afforded adequate insurance protection at cost. The outlay incident to the carrying of risks has been stripped of every unnecessary item of expense.

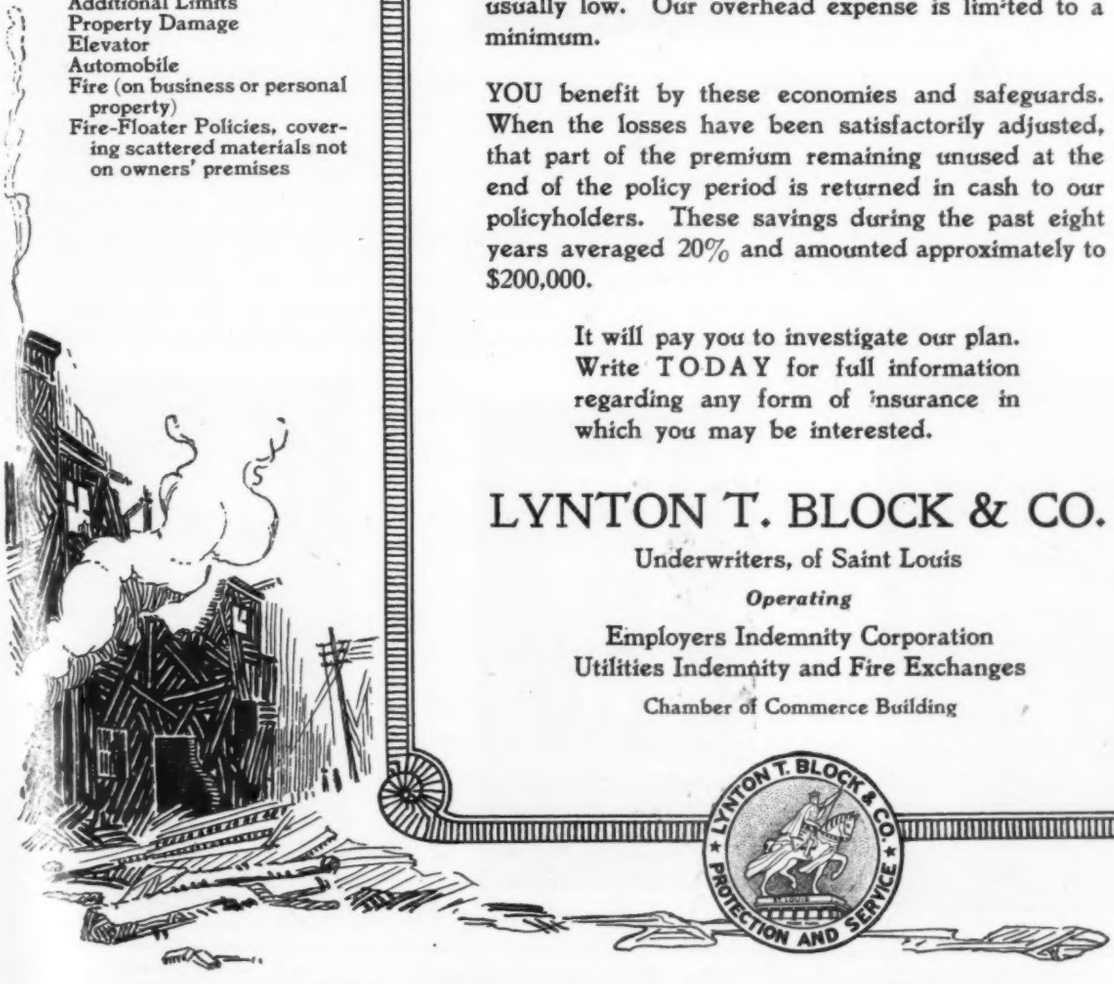
FOR INSTANCE—We have no agents and so pay no commissions. Our solicitors are paid a salary depending largely on the character, rather than the quantity, of the business they produce. As we write only a selected class of risks, our loss ratio is unusually low. Our overhead expense is limited to a minimum.

YOU benefit by these economies and safeguards. When the losses have been satisfactorily adjusted, that part of the premium remaining unused at the end of the policy period is returned in cash to our policyholders. These savings during the past eight years averaged 20% and amounted approximately to $200,000.

It will pay you to investigate our plan. Write TODAY for full information regarding any form of insurance in which you may be interested.

Insurance Written

Workmen's Compensation
Public Liability
Farmers' Lines Liability
Employers' Liability
Teams' Liability
Contractors' Contingent
Additional Limits
Property Damage
Elevator
Automobile
Fire (on business or personal property)
Fire-Floater Policies, covering scattered materials not on owners' premises



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LYNTON T. BLOCK & CO. ★ PROTECTION AND SERVICE ★

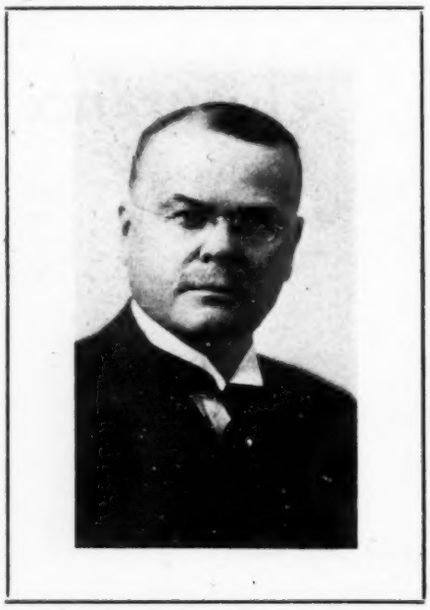
Garys Control British Automatic

Announcement Made That Theodore Gary and Associates Have Purchased Controlling Interest in Strowger Automatic Manufacturing Company in England —Arrangements for Selling and Installing Automatic Throughout World

H. L. Gary, vice-president and treasurer of Theodore Gary & Co., of Kansas City, Mo., announced this week that the syndicate consisting of Theodore Gary, A. F. Adams, H. L. Gary, and F. H. Woods, which owns and controls the International Sales & Engineering Corp., of New York, and its manufacturing subsidiary, the Automatic Electric Co., of Chicago, had, together with J. B. Russell of New York, and James Taylor and D. Sinclair of London, England, who are well known in connection with the British Insulated & Helsby Cables, Ltd., of London, and various other British corporations, organized the International Automatic Telephone Co., Ltd., of London. Through this company it has purchased control of the Automatic Telephone Mfg. Co., of Liverpool, Eng.

A substantial amount of new capital has been advanced by the syndicate for the new International company to be used in the extension of the Liverpool company's factory so that the manufacture of Automatics can be carried on on a large scale. The Liverpool company has, since 1912, manufactured automatic telephone apparatus under license from the Automatic Electric Co., of Chicago.

The Liverpool organization remains unchanged, and manufacture will proceed on the same lines as formerly, but the new arrangement will enable customers to benefit from quantity production of automatic telephone equipment. This interlocking of interests through the International Telephone Sales & Engineering Corp., of New York, and the International Automatic Telephone Co., Ltd., of London, will make available for Strowger business throughout the world, the large staff of engineers controlled by the Automatic Electric Co., of Chicago, the staff of which were inventors of the automatic telephone. The Chicago company is the only organization in the world today manufacturing automatic telephones exclusively and on the basis of quantity production.



Theodore Gary, President of Theodore Gary & Co., is Now in England.

Mr. Gary also stated that arrangements had been made by which the Western Electric Co., Ltd., of London, undertook, under license, the distribution of Strowger automatic equipment, as manufactured at Liverpool, in certain territory throughout the world outside of the United Kingdom of Great Britain and Ireland, also outside of the United States and other territory in which the International Telephone Sales & Engineering Corp., of New York, and the Automatic Electric Co., of Chicago, do business, and also outside of territory covered by license given by the Automatic Electric Co., of Chicago, to Thomson-Houston, of Paris, France.

Theodore Gary & Co., of Kansas City, which are the syndicate managers, have for many years been prominently connected with large Independent exchange and long distance telephone properties in the United States, and also with various other enterprises.

The officers of Theodore Gary & Co. are: Theodore Gary, president; A. F. Adams, vice-president; H. L. Gary, vice-president and treasurer, and C. A. Bennett, secretary. A. F. Adams has just returned on the "Mauretania" from a nine months' trip to Europe where he has been conducting the negotiations now concluded. Theodore Gary, now in England, will remain abroad some months in connection with the business of the new enterprise.

A. F. Adams, Vice-President, Just Returned from England, Conducted the Negotiations.

F. H. Woods, Member of Syndicate Controlling International Sales & Engineering Corp.

H. L. Gary, Vice-President and Treasurer, Is Active in the Company's Financial Affairs.

Magneto Steel Wall Telephone Type No. 315

FEDERAL TELEPHONES
FOR EVERY REQUIREMENT

Modern Steel Cabinet Wall Telephones

Desk Telephones

Magneto Switchboards Common Battery

Intercommunicating Systems
(Corwin)
Non-Secret—Full-Secret—Secret-Trunk

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WRITE FOR BULLETINS

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BUFFALO, NEW YORK

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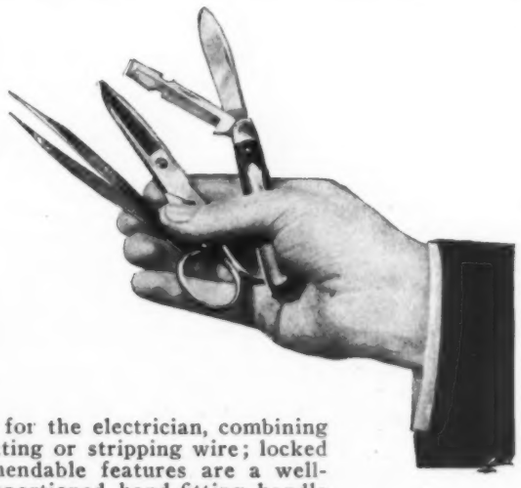
Columbus, O.

Here are Useful Tools for Electricians and Linemen



We can meet requirements with immediate shipments of these tools.

ELECTRICIANS' KNIFE—A handy combination for the electrician, combining an emergency screw driver, a knife blade for cutting or stripping wire; locked so that it cannot close during use. The commendable features are a well-tempered blade, a strong joint, a solid well-proportioned hand-fitting handle and a lock to keep the blade securely open, yet promptly releasable when it is desired to close the blades. Screw driver blade is locked when open; to unlock, press down on large blade.

ELECTRICIANS' SCISSORS—Designed for the electrician and mechanic. Will stand continued hard service. Made of high-grade steel properly tempered. Has a screw hinge, allowing adjustment. Nickel plated finish.

ELECTRICIANS' TWEEZERS—Electricians' wire tweezers are used quite extensively in the electrical field in picking up small objects, and "fishing" for small wires, and they are found useful in a number of other ways. Furnished in either "V-pointed" or "rounded point" style.

Mathias Klein & Sons, 3200 Belmont Ave., Chicago

Record of Telephone Patents

1,331,345. February 17, 1920; filed May 15, 1919. SANITARY DEVICE FOR TELEPHONES; two claims; D. P. Lopez, San Nicolas, Cuba. This device consists of means for securing to the earpiece of a telephone receiver a number of layers of paper having holes in the center. The sheets of paper may be removed as the telephone is used.

1,332,208. March 2, 1920; filed February 11, 1918. MEASURED SERVICE TELEPHONE SYSTEM; 34 claims; J. Erickson, Chicago; assigned to Automatic Electric Co. The feature of this patent is the provision of means controlled by the response of the called subscriber for reversing the current in the calling line. Means are controlled by the initiation of the connection for rendering a relay in the talking circuit inoperative and to momentarily render it operative when the reversal of current takes place. The relay controls means for shunting the talking equipment.

1,332,217. March 2, 1920; filed May 21, 1917. AUTOMATIC TELEPHONE SYSTEM; E. Jacobson; 14 claims; assigned to Automatic Electric Co. A double-wound relay is the feature of this system, one winding being for energizing the relay and the other for retarding its action. Automatic means cause currents of various strengths to flow in the energizing winding, and the retarding action of the other winding is dependent upon the strength of the current caused to flow through the energizing winding.

1,332,222. March 2, 1920; filed April 13, 1918. AUTOMATIC TELEPHONE SYSTEMS; 32 claims; A. E. Lundell, Chicago, and G. Thompson, Mt. Vernon, N. Y.; assigned to Western Electric Co. A coin device is associated with each of the subscribers' lines and has controlling means for governing its operation. Means are common to a group of connecting circuits for automatically associating the controlling mechanism with any one of the group of connecting circuits used in establishing the connection in order to control the operation of the calling device of the calling line.

1,332,226. March 2, 1920; filed January 4, 1906. COMMON BATTERY AUTOMATIC TELEPHONE SYSTEM; 42 claims; T. G. Martin, Chicago; assigned to Automatic Electric Co. Repeating coils are located in a trunk for connecting one selector with the other and calling impulses in the trunk on one side of the coil are repeated in the trunk at the other side thereof.

1,332,275. March 2, 1920; filed October 5, 1914. TELEPHONE SYSTEM; 10 claims; H. Steidle, Munich, Germany; assigned to Siemens & Halske, Berlin, Germany. In this automatic system provision is made for establishing connection between subscriber's lines with unrestricted service and lines with restricted service. Some of the selectors are set by number impulses and by automatic operation find a free trunk line. Connectors, used for unrestricted service, are set by a number of series of number impulses while other selectors and connectors for restricted service and in number equal to the number of series of number impulses, are arranged in series and are set by a single series of number impulses. The connection with a free trunk line issuing from the last of the selectors, is made by a series of relays.

1,332,564. March 2, 1920; filed March 19, 1919. TELEPHONE LOCKING DEVICE; seven claims; T. G. Murton, Detroit, Mich. This locking device for desk-stand receiver hooks is clamped to the standard and includes a key-operated lock member. The lock member is independent of the clamp attachment and is arranged to be movable into or from the path of the receiver hook to prevent or permit its operation.

1,332,604. March 2, 1920; filed March 6, 1919. TELEPHONE DIRECTORY DEVICE; one claim; F. R. Chester, New York. This device, in the shape of a circular frame with a name disk and number, is adapted for attachment to the face plate of a transmitter.

1,332,873. March 2, 1920; filed January 2, 1918. TELEPHONE TRANSMITTER; six claims; P. L. Jensen, San Francisco, Calif.; assigned to the Magnavox Co., San Francisco, Calif. Supporting means are provided for positioning the transmitter with its diaphragm in position to receive the direct impact of vocal sound waves on one side only. Independent face-engaging pads are spaced from the edges of the diaphragm and from each other and provision is made for holding the pads in position against the face of the transmitter user with the diaphragm in front of the mouth.

1,332,927. March 9, 1920; filed August 8, 1918. REELING DEVICE; seven claims; T. C. Smith, East Orange, N. J.; assigned to American Telephone & Telegraph Co. This reel comprises side members, a winding hub or drum, and a spring member mounted between the side members for forcing successive convolutions of the material to be wound against one of the side members.

1,332,976. March 9, 1920; filed June 6, 1918. SIGNALING SYSTEM; 12 claims; A. D. Dowd, Hoboken, N. J.; assigned to Western Electric Co. The feature of this selecting system is an electrical storage device which has character-determining elements for storing electrical impulses in predetermined combinations. A distributer utilizes the stored impulses, and stores additional impulses in those devices which were unaffected by the character-determining elements, to operate an electro-responsive device which controls the line circuit.

1,333,013. March 9, 1920; filed February 20, 1918. BUTTON; four claims; R. M. DeVignier, Hollis, N. Y.; assigned to Western Electric Co. A protecting casing having an aperture therein surrounds the body portion of this molded button. Indicating means are provided for closing the aperture and are held in a fixed position by projecting portions embedded in the body portion of the button which is made of insulating material.

1,333,014. March 9, 1920; filed August 19, 1918. SIGNALING SYSTEM; three claims; J. C. Field, Orange, N. J.; assigned to Western Electric Co. A repeating coil is so connected as to divide the line wires into inductively-united sections. Telegraph apparatus is connected between the ground and the middle point of each inductive bridge for the line wires and each repeating coil winding. A selective signaling device is connected in bridge of the line wires of each local station. Means including a condenser are connected in one line wire at the central station for impressing impulses of opposite polarity upon the line wires for controlling the operation of the selective signaling devices.

1,333,015. March 9, 1920; filed February 16, 1918. BUTTON; three claims; B. Freile, Bogoda, N. J.; assigned to Western Electric Co. This molded button has its body portion made of plastic material and the indicating means for closing the apertures in the protecting facing has its attaching means integrally united with the casing by the body portion.

1,323,026. March 9, 1920; filed December 27, 1916. TELEPHONE SYSTEM; six claims; A. E. Lundell, Chicago; assigned to Western Electric Co. The feature of this automatic system is the provision of means for indicating the failure of the automatic switch associated with the lines to function properly and to render the telephone line unselectable when the switch thus fails.

1,333,027. March 9, 1920; filed April 12, 1917. TELEPHONE SWITCH-CONTROLLING SYSTEM; eight claims; A. E. Lundell, Chicago; assigned to Western Electric Co. A single relay controls the successive association of a number of operable switching devices with a controlling circuit extending from another relay toward the devices.

1,333,111. March 9, 1920; filed January 17, 1918. IMPEDANCE EQUALIZER FOR USE WITH TRANSFORMERS; six claims; R. S. Hoyt, Brooklyn, N. Y.; assigned to American Telephone & Telegraph Co. An impedance element is associated with the secondary winding of a transformer while a transmission circuit is associated with the primary winding. Means are associated with the primary circuit whereby the resultant impedance of the primary circuit is rendered substantially equal at all frequencies to the secondary impedance multiplied by the transformer ratio.

1,333,117. March 9, 1920; filed June 23, 1915. RINGING AND LISTENING KEY; 10 claims; A. Klay, Chicago; assigned to Kellogg Switchboard & Supply Co. The feature of this key lies in the strips of insulating material between the sets of contact springs. They have oblique surfaces to discharge any foreign matter that may fall between the sets of springs.

1,333,596. March 16, 1920; filed September 25, 1917. TELEPHONE SYSTEM; 14 claims; W. P. Andrick, Jamaica, N. Y.; assigned to Western Electric Co. In this intercommunicating system, a trunk circuit is multipled to a number of subscribers' stations and a bridge is provided for holding the trunk circuit in substitution of a telephone set. Switching means include a differential relay which controls the substitution. An energizing circuit for the differential relay is completed through a contact of a relay in the trunk circuit, while a releasing circuit for the differential relay is completed through contacts of the trunk relay and a local circuit relay when energized.

1,333,744. March 16, 1920; filed December 20, 1916. TELEPHONE TRANSMITTER; 13 claims; E. C. Wente, New Haven, Conn.; assigned to Western Electric Co. The normal natural frequency of the vibrating member of this transmitter is within the range of speech frequency and provision is made for increasing its natural frequency above

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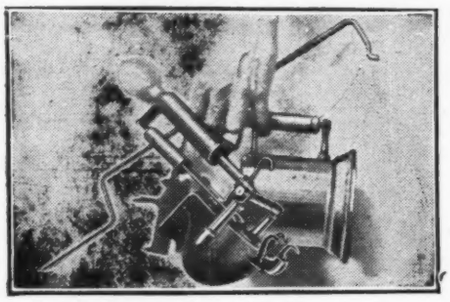

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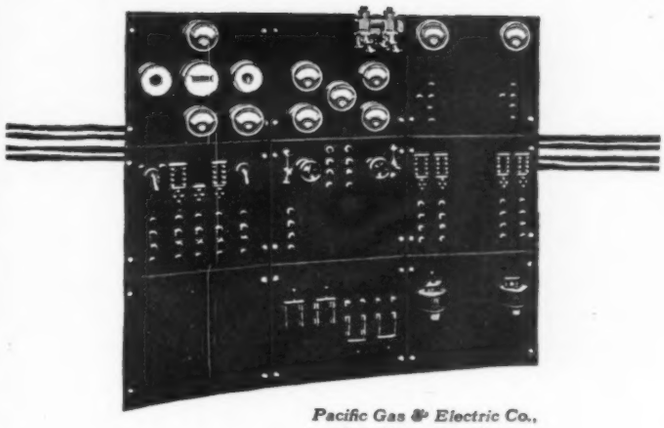

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the range of essential speech frequency.

1,333,758. March 16, 1920; filed May 24, 1917. TELEPHONE SYSTEM; 5 claims; C. W. Keckler, Newark, N. J.; assigned to Western Electric Co. The feature of this system is the provision of a relay individual to each station which serves, when energized, to comple the connection between the circuit leads and the line conductors. An energizing circuit for this relay, including a portion of the circuit lead, is established upon the actuation of a switch, and a locking circuit for the relay is completed upon its energization. A common relay is controlled over the line conductors by the individual relay to disable the energizing circuit of all other individual relays.

1,333,771. March 16, 1920; filed March 18, 1914. VOLTAIC CELL AND BATTERY; 20 claims; F. R. Parker, Chicago. This cell is rather broad, flat and disk-shaped. By this construction a rigid battery unit may be built out of individual cell units by stacking one upon another. The cell is smaller and of lighter weight than those of ordinary construction and is claimed to have increased efficiency.

1,334,037. March 16, 1920; filed February 2, 1917. RELAY; 17 claims; W. Kaisling, Chicago; assigned to Kellogg Switchboard & Supply Co. A member secured to the rear end of the core serves to extend the magnet circuit of the magnet toward the front end. A contact spring supported by this member has a normal and an alternate position. Energization of the electromagnet actuates the armature and ratchet wheel so as to move the spring from the normal to the alternate position while a subsequent energization of the magnet moves it back to its normal position.

1,334,077. March 16, 1920; filed February 5, 1907. SEMI-MECHANICAL TELEPHONE SYSTEM; 49 claims; A. M. Bullard (deceased); assigned to Western Electric Co. A connecting circuit is adapted to be united with a party line having multiple terminals. An operative circuit for a controlling relay of a revertive signal is completed only through the multiple terminals of the party line at each end of the connecting circuit.

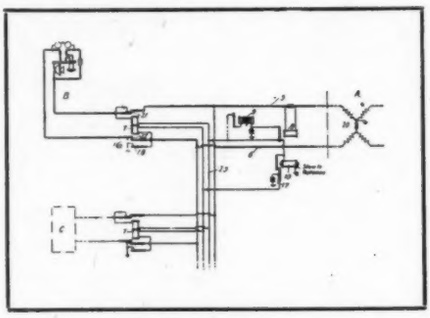
1,334,080. March 16, 1920; filed February 23, 1918. IMPULSE SENDING DEVICE; 10 claims; H. P. Clausen, Mt. Vernon, N. Y.; assigned to Western Electric Co. An impulse wheel having movements in different directions operates means while moving in one direction for actuating impulse springs to cause the initial impulse of a series to be of different character from the succeeding pulses of the series.

1,334,093. March 16, 1920; filed October 18, 1916. TELEPHONE TRANSMITTER MOUTHPIECE; four claims; J. W. Harris, Montclair, N. J.; assigned to Western Electric Co. A method is described of securing a ferrule through the body portion of a mouthpiece. It consists of inserting a resilient shock-absorbing member of vulcanizable material there-between and subjecting the combined structure to a vulcanizing temperature.

1,334,105. March 16, 1920; filed June 21, 1916. SWITCH CONTROLLING SYSTEM; 12 claims; A. E. Lundell, Chicago; assigned to Western Electric Co. The feature of this switch-controlling system is the provision of means for intermittently interrupting the actuating circuit of a solenoid for moving one of the interconnecting selector switches, at one point to maintain the speed of movement of the selector uniform, and a test magnet for permanently interrupting the circuit at another point when the first idle trunk is reached.

1,334,125. March 16, 1920; filed August 12, 1918. TELEPHONE EXCHANGE SYSTEM; 37 claims; S. B. Williams, Jr., Brooklyn; assigned to Western Electric Co. An extension circuit having a number of branches is provided for a group of telephone lines. A testing device is associated with each branch and is responsive to the calling condition of any line. Provision is made for bringing the branches successively into connection with each of the lines of the group while means under the control of each testing device effect the connection of the extension circuit with a calling line by way of the associated branch.

1,334,276. March 23, 1920; filed March 31, 1916. CONTACT TERMINAL BANK; 18 claims; A. H. Adams, Sparkill, N. Y.; assigned to Western Electric Co. In this contact bank, a series of substantially



No. 1,333,758.

parallel contact strips are formed at their ends with integral removable connecting portions.

1,334,294. March 23, 1920; filed January 30, 1917. TELEPHONE EXCHANGE SYSTEM; 12 claims; A. H. Dyson, Montclair, N. J.; assigned to Western Electric Co. The feature of this system is the provision of testing means for one of two selectively operable switching devices which prepare a connection between two lines, associated with the other device. Means dependent upon the busy or idle condition of one of the lines, actuate the testing means and other means, operable in response to the actuating of the testing means, complete the connection at one of the devices.

1,334,300. March 23, 1920; filed September 11, 1916. TELEPHONE EXCHANGE SYSTEM; 14 claims; C. L. Goodrum, Brooklyn, N. Y.; assigned to Western Electric Co. A trunk circuit leads to an operators' position and means are provided for interconnecting any incoming line circuit with the trunk circuit. A characteristic tone generater is associated with the incoming line circuit while a circuit independent of the talking conductors of the trunk circuits and the incoming line circuits, inductively connect the generator to the operator's position.

1,334,308. March 23, 1920; filed May 28, 1918. TELEPHONE EXCHANGE SYSTEM; 10 claims; A. E. Lundell, Chicago, and A. B. Sperry, New York; assigned to Western Electric Co. In this system, which includes a number of exchanges, a trunk circuit outgoing from a first exchange terminates in a switch at a second of the exchanges. A second trunk circuit outgoing from a second exchange, terminates in a switch at a third of the exchanges. Means are provided for sending impulses over the trunks from the first to the second exchange, the switch at the second exchange being responsive thereto to connect the first trunk either to the line or to the second trunk. Means are operated by the establishment of such latter connection to disable the source of current and to convert the trunks into a single through trunk arranged to transmit impulses directly from the first to the third exchange, the switch at the third exchange being responsive to such impulses to further extend the through trunk circuit.

1,334,307. March 23, 1920; filed December 29, 1916. TELEPHONE SYSTEM; 16 claims; A. E. Lundell, Chicago; assigned to Western Electric Co. Two signals at one of a number of offices through which certain of a number of lines may be connected, indicate the electrical condition of the lines. Only one of the signals operates during a completed call. Means at this office co-operate in controlling the operation of one of the signals while the actuation of the other signal is controlled through means at another office. An automatic device controls the operation of both of the signals.

1,334,311. March 23, 1920; filed December 27, 1916. TELEPHONE SYSTEM; 13 claims; W. H. Matthies, Hackensack, N. J.; assigned to Western Electric Co. In this system, automatic switches interconnect any incoming line with any outgoing line. Means control the setting of one of the switches in operative relation to a group of incoming lines and subsequently control the setting of a second automatic switch in operative relation to a corresponding group of outgoing lines.

1,334,319. March 23, 1920; filed May 12, 1917. TELEPHONE ATTACHMENT; two claims; H. J. Richards, Brooklyn, N. Y. A receiver supporting bracket in combination with a receiver-hook-controlling trip and a counterweight is described in this patent.

1,334,321. March 23, 1920; filed August 9, 1918. LOADING COIL AND METHOD OF CONSTRUCTING SAME; four claims; W. J. Shackelton, Scotch Plains, N. J.; assigned to Western Electric Co. A method described of compensating for differences in permeability between sections of the core of an inductive coil carry the different main windings for the physical circuits in which the coil is to be connected. It consists in connecting to each main winding a supplementary winding and adjusting by trial the supplementary winding on sections of the core adjacent to the sections carrying the windings with which the supplementary windings are connected.

1,334,541. March 23, 1920; filed March 20, 1916. TELEPHONE TRANSMITTER; 11 claims; A. R. Kahl, Withington, England. The feature of this transmitter construction is that the variable resistance element is secured on one side to the diaphragm and has a stud projecting from its other side. A bushing is carried by and insulated from the transmitter bridge for receiving the stud, and the bushing and the stud are attached to each other to form a rigid structure without displacement of the stud in the bushing.

1,334,735. March 23, 1920; filed July 3, 1917. CONTROLLING DEVICE; 17 claims; E. H. Clark, New York; assigned to Western Electric Co. This controlling device includes means for producing a series of impulses of various characteristics, a chain of switching relays and means responsive to the series of impulses for actuating the relays.